

seeing
gray

OCT 22 1943

MOTOR AGE

FOR AUTOMOTIVE
SERVICEMEN

OCTOBER 1943



A CHILTON PUBLICATION

AGE

Soft pressure

DOES IT!



Soft pressure means longer engine life. And that's important, today especially.

Hastings Steel-Vent piston rings are built around the soft pressure principle. Thus they stop oil-pumping without need of high pressure — and check cylinder wear, too.

In today's job-jammed shops, repairs that keep 'em out of the shop and on the road are a "must."

That's why service men, all over the country, install Hastings Steel-Vent sets, "motor engineered" to handle all three cylinder conditions: re-ring, rebore, and resleeve.



HASTINGS MANUFACTURING COMPANY, HASTINGS, MICHIGAN
Hastings Mfg. of Canada, Ltd., Toronto

It's a privilege to buy War Bonds

HASTINGS
STEEL-VENT PISTON RINGS

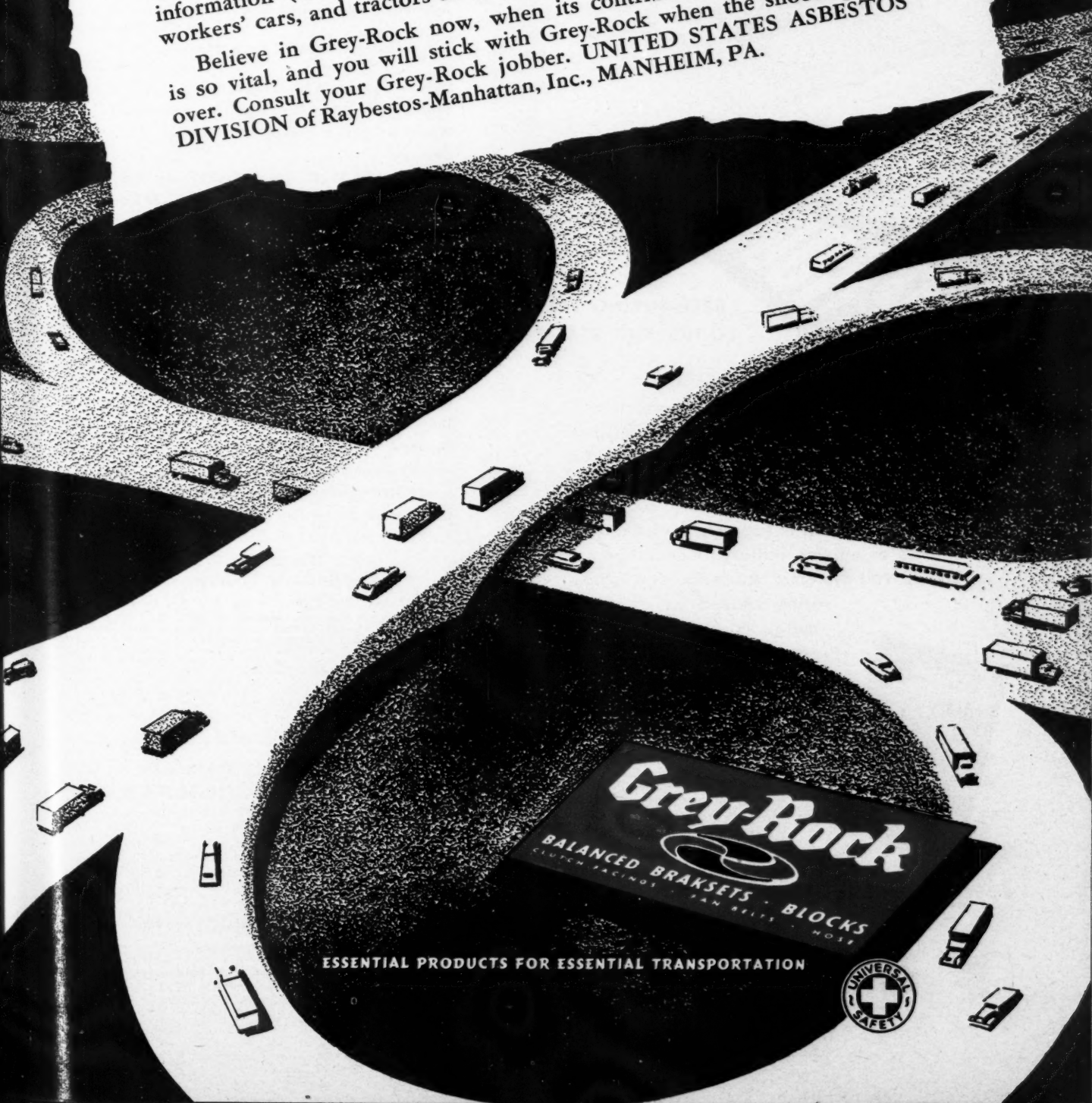
TOUGH on Oil-Pumping... GENTLE on Cylinder Walls

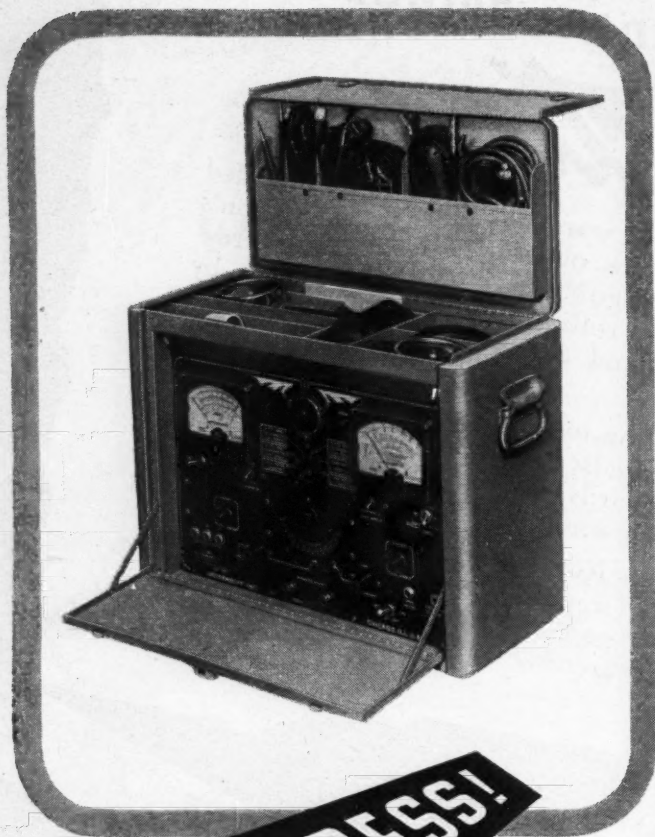
TRANSPORTATION BUILDS A BRIDGE FOR *Production*

Goods piled on shipping-floors don't win wars, nor do workers stranded on street-corners, looking for a lift. Here, obviously, is transportation's job . . . loading, hauling, unloading, and going back for more. And Grey-Rock's job is to keep essential vehicles rolling in an endless stream, by providing high-quality brake linings and clutch facings, with service-methods to match.

Grey-Rock is in an excellent position to perform that job. In spite of Hitler and high water, it has the materials, the engineering, the technical information (embracing N.S.C. standards) to keep trucks, buses, war-workers' cars, and tractors *on the job, around the clock.*

Believe in Grey-Rock now, when its contribution to transportation is so vital, and you will stick with Grey-Rock when the shooting's all over. Consult your Grey-Rock jobber. UNITED STATES ASBESTOS DIVISION of Raybestos-Manhattan, Inc., MANHEIM, PA.





PROGRESS!

**KEEP BUYING WAR
BONDS AND STAMPS**

A REAL step forward has been made with the introduction of the new Weidenhoff Model 1019 Portable Engine Analyzer for testing electrical circuits and engine performance. It's compact, easy to use and operating current is supplied by battery in vehicle or outside battery. Checks both 6 and 12 volt systems. All leads and accessories housed in a strong metal case. It's for the armed forces now to keep transportation at its best.

For the service station when the victory is won.

This handbook of Engine Maintenance sent free to those requesting it on their letterhead. This offer is for a limited time only.



JOSEPH WEIDENHOFF, INC. CHICAGO 24, ILL.



BENCH ENGINE ANALYZERS BATTERY CHARGERS MAGNETO TESTERS ELECTRICAL TESTING & SERVICE EQUIPMENT



MOTOR AGE

With Which is Combined **AUTOMOBILE TRADE JOURNAL**

FOR AUTOMOTIVE SERVICEMEN

Vol. LXII, No. 11

October, 1943

JULIAN CHASE, Directing Editor
W. K. TOBOLDT, Editor
J. EDWARD FORD, Managing Editor
J. ROBERTSON TURNER, Tech. Editor
J. K. MONTGOMERY, Asst. Tech. Editor
HOWARD KOHLBRENNER, Art Editor
JOS. GESCHELIN, Detroit Tech. Editor
E. L. WARNER, JR., Detroit News Editor
J. A. LAANSMA, Merchandising Editor
M. AINSWORTH, Specifications Editor

In This Issue

Automotive Parts Industries in the War	17
<i>By Ed Warner</i>	
The Industry's Debt to Parts Makers	34
<i>By Julian Chase</i>	
Chronology of WPB Orders	37
Tune-Up for War and Winter	38
<i>By Bill Toboldt</i>	
Wheel Alignment Keeps 'em Rolling	40
Cartoon	41
Adjusting G. M. C. Truck Brakes	42
<i>By Bob Turner</i>	
New Life for Crankshafts	44
<i>By J. Edward Ford</i>	
Dealer Business Booms with Used Cars	46
Rationed Service	48
<i>By Rose Lu DeWindt</i>	
War Brings New Lube Needs	49
Did You Know It?	50
Washington Whispers	52
New Profit Makers	54
News	56
Service Hints from the Factory	59
Cooling System Capacities	60
Shop Kinks	61
Readers' Clearing House	62
Legally Speaking	88
Advertisers' Index	150

Copyright 1943 by Chilton Company (Inc.)

Automotive Division

Jos. S. HILDRETH, President and Manager

JULIAN CHASE, Vice Pres.

G. C. BUZBY, Vice Pres.

Offices: Philadelphia 39, Pa.—Chestnut & 56th St., Phone Sherwood 1434.
New York 17, N. Y.—100 E. 42nd St., Phone Murray Hill 5-8600. Chicago 1, Ill.—Room 916 London Guarantee & Accident Bldg., Phone Franklin 4242.
Detroit 2, Mich.—1015 Stephenson Bldg., Phone Madison 2090. Cleveland 14, Ohio—609 Guardian Bldg., Phone Cherry 4188. Washington 4, D.C.—1061 National Press Bldg., Phone District 6877. San Francisco 5, Cal.—605 Market St., Room 708, Phone Douglas 0967. Los Angeles 1, Cal.—6000 Miramonte Blvd., Phone Lafayette 5525. Member of Audit Bureau of Circulations. Member of Associated Business Papers, Inc. Subscription Price: United States and Possessions, Latin-American Countries, \$2.00 per year; Canada and foreign, \$3.00 per year. Single copies, 25c.

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices

Chestnut and 56th Streets, Philadelphia 39, Pa., U. S. A.

Officers and Directors

C. A. MUSSELMAN, President

Vice Presidents

JOSEPH S. HILDRETH **GEORGE H. GRIFFITHS**
EVERET B. TERHUNE **J. H. VAN DEVENTER** **C. S. BAUE**
WILLIAM A. BARBER, Treasurer **JOHN BLAIR MOFFETT**, Secretary
JULIAN CHASE **THOMAS L. KANE** **G. C. BUZBY**
P. M. FAHRENDORF **HARRY V. DUFFY** **CHARLES J. HEALE**

MOTOR AGE

OCTOBER 1943

Automotive PARTS INDUSTRIES IN THE WAR

Backing our armed forces on land, on sea and in the air are the entire automotive, parts, accessory, materials, tool and service equipment industries. All of us owe a supreme debt of appreciation and gratitude to them for the resourcefulness, the ingenuity, the skill and the wisdom which have helped enormously to supply our sons, brothers and friends with sinews of war in such quantity and quality that the war period is measurably shortened, and victory assured.

As a gesture of sincere appreciation for all that the group has done for this country and its Allies, in these days of war and in days of peace as well, Motor Age dedicates this October issue to the automotive manufacturers of America.

NAL

1943

Editor
Editor
Editor
Editor

17

34

37

38

40

41

42

44

46

48

49

50

52

54

56

59

60

61

62

88

50

Pres.
and 1494
Chicago 1.
in 4243.
and 14.
C.—1061
Market St.
e Blvd.
number of
sessions.
per year.

FIFTH
BAUR
cretary
BUZZY
HEALE

AGE



AUTOMOTIVE P



E PARTS INDUSTRIES

IN THE WAR

By ED WARNER

THE bombers dropping their block busters on Berlin, the tanks driving Marshal Rommel out of El Alamein, the amphibians landing our troops on Sicily and Italy, the planes of Doolittle over Tokyo, the convoys taking supplies to Murmansk and troops to Africa, the ships of our Navy blasting the Japanese in the Coral Sea, all have laid paving stones on the road to eventual victory. What all these instruments of warfare and many others have done has been made possible to an immeasurable extent by those companies which have been and even now are supplying MOTOR AGE readers with replacement parts and supplies, shop equipment, and material, accessories, and hand tools. The lives of our fighting men to a like degree depend

One of the main reasons why our planes, tanks and trucks are outperforming those of the Axis is the superiority of the gasoline which has been made available by American refiners. By raising the octane value of fuel from 87 to 100, the power of the engines was increased one-third. (Official U. S. Army Signal Corps Photo.)

AUTOMOTIVE PARTS INDUSTRIES



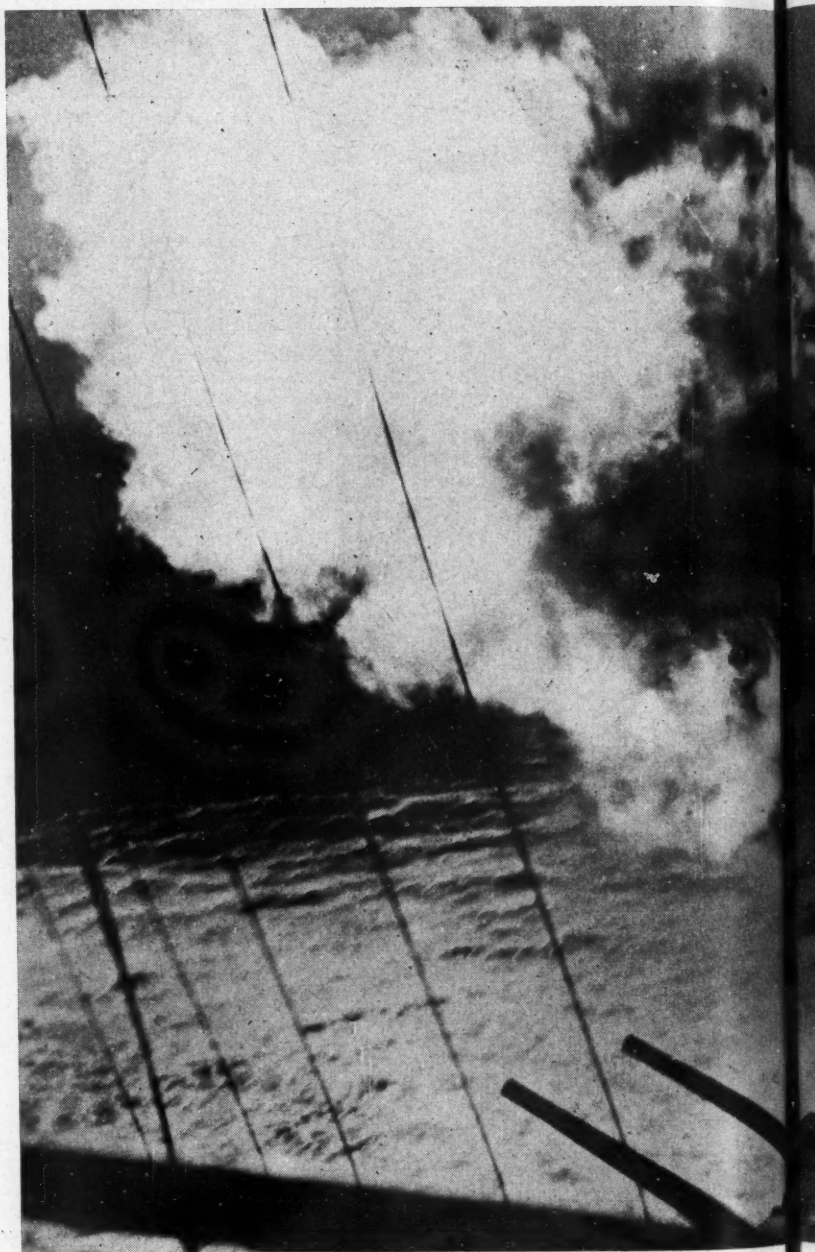
on these same manufacturers whom we commonly group and call our parts and equipment manufacturers.

The vehicles our soldiers, sailors, and Marines ride in, the tanks, planes, warships, submarines, dirigibles, trucks and jeeps, the guns they fire and the bombs they drop are manufactured, in some cases completely and in others in part, by these same companies.

Formerly these companies were engaged in making many of the 5500 parts and much of the fabricated materials that go into a modern motor car, as well as a multitude of maintenance equipment and accessories. Now they are making such dissimilar products as amphibious tractors, bomber turrets, armor plate, machine guns, helmets, bullets and parachutes.

But these same manufacturers of parts and equipment also play an important part on the home front. They must produce the millions of vital parts that will assure the continued operation of the nation's more than 30,000,000 motor

Rickenbacker drifted for many days on the Pacific in a rubber raft similar to this one. Rafts are made by the same companies which provide tires for the Nation's cars and trucks. (Official U. S. Army Air Forces Photo.)



vehicles so essential to the war effort. These vehicles carry the war worker to and from his job. They transport material into war plants and they haul away the finished munitions for delivery to the battle front. They help maintain the economic fabric of America, so that the 8,000,000 men in the armed

forces can today carry on against the enemy and tomorrow, when the peace is won, will have a stable country to which to return.

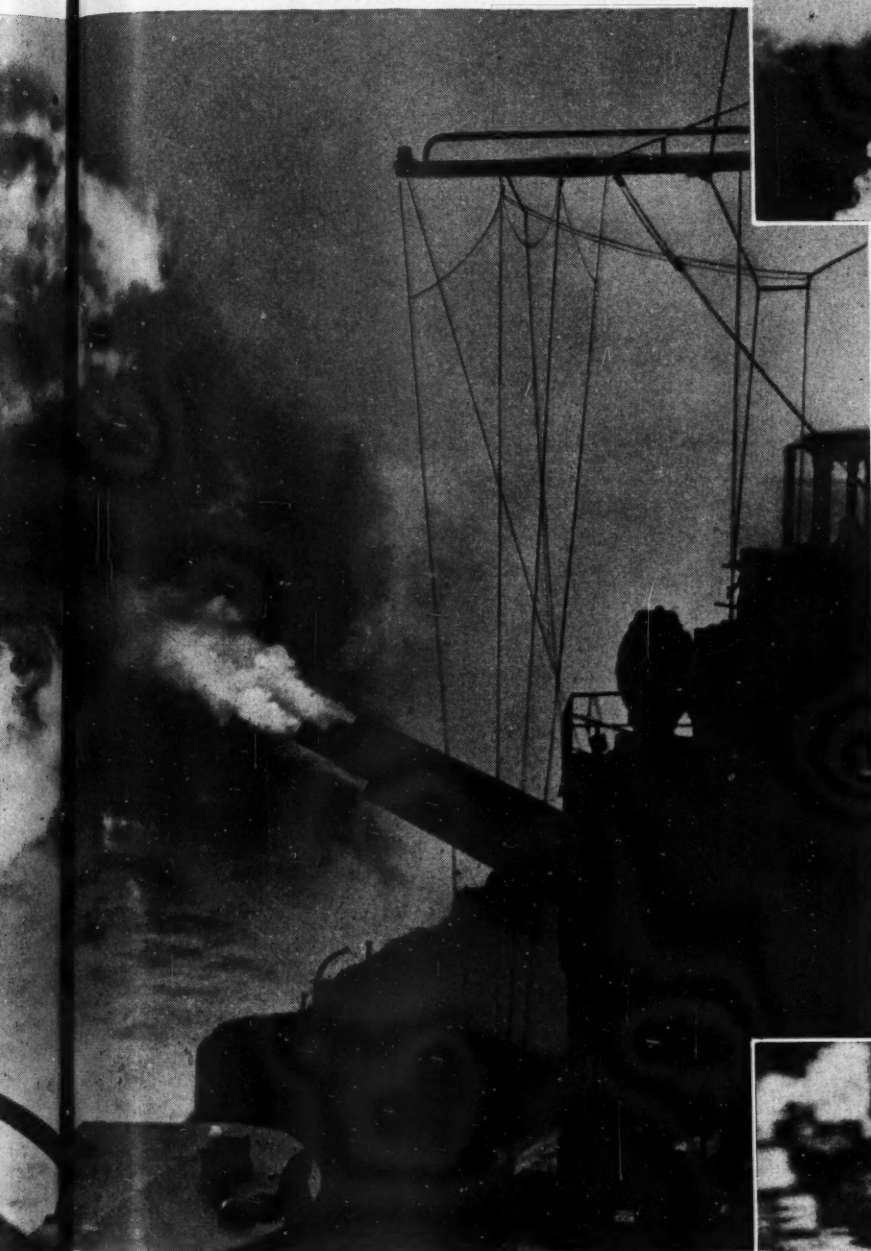
The nation is now more dependent than ever upon these manufacturers of automotive parts, because no new automobiles have been built for civilian use since Feb. 10, 1942.



When it comes to catching a Zero or an ME 110, it takes plenty of speed and this liquid-cooled job has what it takes. Ignition system, carburetion, bearings, valves, springs, instruments and wiring, produced by the automotive parts industries, are only a few of the items that help to make this one of our fastest planes. (Official U. S. Air Forces Photo.)

When the Americans landed at Salerno, the big guns of the battle wagons kept the German tanks off the beach and up in the hills. Many of the shells fired from these ships were produced in automotive parts plants. (Official U. S. Navy Photo.)

As our men forded streams and climbed mountains to get the elusive Jap in the South Pacific, the ammunition and carbines they carried and the steel helmets on their heads were, for the most part, produced in automotive plants. (U. S. Army Signal Corps Photo.)



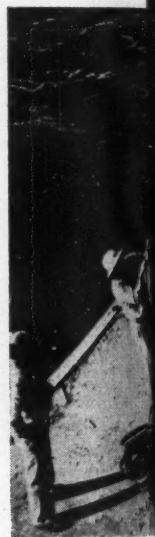
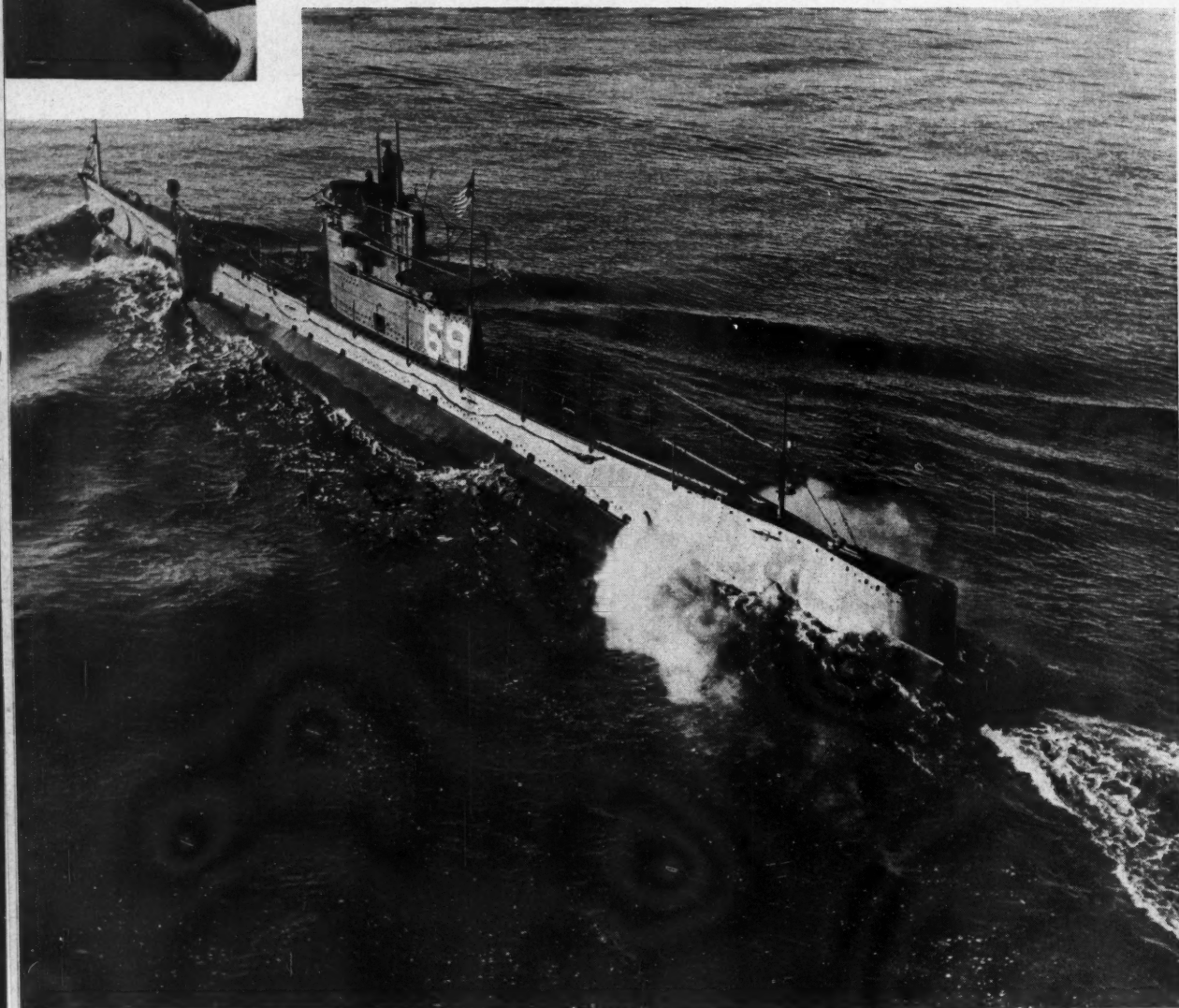
All but a mere handful of the civilian passenger cars on the road have been in service at least 20 months. And there are more than 5,000,000 motor vehicles in use (15 per cent of the national total) that are 10 years old or older. An added burden is thus placed on the automotive-parts industry to keep them rolling for the duration.

Confronted with this tremendous task of maintaining vital highway transportation on the home



AUTOMOTIVE PARTS INDUSTRIES

IN



front, parts and equipment manufacturers could have used to the utmost their capacity to produce only the parts, tools, equipment, and accessories demanded by essential civilian vehicles. But war called for quantities far beyond normal output. Makers of parts and accessories had to build thousands upon thousands of units not only for new combat vehicles but also for replacement. Manufacturers of hand tools, shop equipment, materials, and supplies had to produce unprecedented quantities for the armed services' shops in training camps as well as in the fighting zones.

In addition came government request for production of armament that was beyond the capacity and even

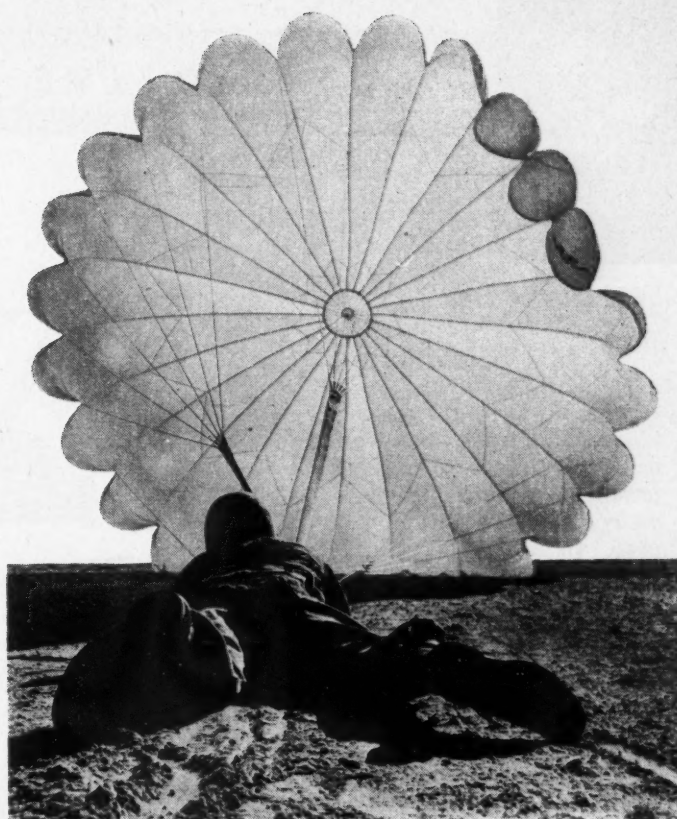
the previous experience of the industry. But the parts and equipment manufacturers, the accessory and hand-tool builders, and the material and supplies industry never hesitated. Without exception, they responded eagerly and splendidly. They stepped up production to the limit in old plants, enlarged existing factories, built new ones, and went ahead. In a word, they threw their effort into war production without stint and without any consideration except the ultimate achievement of victory for Allied arms.

This article endeavors to pay tribute to each and every parts, equipment, accessory, hand tool, material, and supplies firm now producing for victory. The industry is huge, widespread and many-sided. Credit in full and congratulations are extended to all companies comprised by it for their powerful contributions to the war effort.

An oily exhaust on a passenger car spells waste, but on a submarine, left, it means sure death as it leaves an easy trail for the enemy to follow. The piston-ring industry developed special rings to overcome this danger, thus saving the lives of our men and helping to bring destruction to the enemy. (Official U. S. Navy Photo.)

Much of the chute to which the Marine, right, trusted his life was produced by tire and brake-lining manufacturers. (Official U. S. Navy Photo.)

Torpedoes are among the most intricate pieces of equipment used in modern warfare, for once they leave the torpedo racks they are self-propelled. Many of these parts from the detonator to the propeller are supplied by replacement part and accessory manufacturers. (Official U. S. Navy Photo.)



Committee. He said that a survey of more than 800 of the largest parts and equipment makers located in 30 states revealed their 1942 sales volume to be \$2,893,750,000, a 60 per cent increase over 1941 sales of \$1,800,000,000. Employment in these plants advanced 62 per cent, from 250,000 in 1941 to 404,000 in 1942. A later survey of these plants in April, 1943, showed an employment total of 674,000 workers, a gain of 169 per cent over the 1941 figure.

In a recent speech he aptly stated the parts industry's war role when he said: "In peacetime we of this group used our highly specialized skills and facilities, which were developed over many years of highly technical effort and manufacturing experience, to produce many of the components of the automobile—axles and gears, frames, bodies, wheels and hubs, brakes, carburetion, ignition, cooling and lubricating systems and the like. Now we have converted those skills and facilities, and the fruits of our research and experience, to the fabrication of component parts for guns and tanks and planes and hundreds of other mechanized arms."

The automotive parts industry probably represents the best example of well-organized subcontracting in this country's economic system. It is accustomed to supplying its products to a number of large customers who require fast delivery and exacting specifications. Production schedules must be kept and parts must be interchangeable in the automobile industry. One large automobile manufacturer, for example, purchased parts, materials and supplies from 1540 different concerns during peacetime. Most of these companies are now supplying war-production components to this same manufacturer. Another automobile maker had more than 13,000 firms on its procurement list, from which it bought parts and materials that went into

It is difficult to measure the contribution of the automotive parts industry to the war effort on a dollar-volume basis, because it is really an integral part of the complete automobile industry. It is safe to say that its total 1942 production volume was more than \$3 billion. In addition to more than \$2.5 billion worth of war goods, the automotive parts and equipment industry also manufactured \$471,956,896 worth of automotive replacement parts and accessories in 1942, as estimated by the Automotive Council for War Production on the basis of Federal excise-tax receipts from manufacturers.

The president of the Automotive Parts and Equipment Manufacturers, Inc., whose membership of more than 300 companies includes most of the large parts producers, gave an indication of the industry's war effort last spring before the House Military Affairs

AUTOMOTIVE PARTS INDUSTRIES

IN THE

the production of passenger cars and trucks. Likewise, many of these plants are supplying it with parts for its war products. As an example, one of its divisions is manufacturing an aerial torpedo containing 5112 parts, of which 4999, or 98 per cent, are obtained from subcontractors.

The parts companies, as long-time suppliers, were familiar with automotive manufacturing practices and thus were able to fit into the war-production picture much more readily than companies not accustomed to the techniques and tempo of the automobile business.

One of the outstanding industrial efforts of the war is that of the piston-ring manufacturers, which are not only making rings for tanks and military vehicles but are being called upon to turn out millions of rings for the huge air armada that is smashing Axis targets from the sky. A combat airplane engine may require 15 to 25 times as many piston rings as an automobile engine because replacement needs are estimated at 600 or 700 per cent of the original requirements. Chrome plating has overcome the tendency of the rings to disintegrate in test dives of high-speed planes as well as greatly increasing the life of the rings. One



large piston-ring manufacturer, which made rings in World War I for our own and foreign aircraft engines, is now making bronze rings for oil seals in aircraft engines, as well as the standard cast-iron type for aircraft, automotive and marine use. An aircraft ring takes 10 to 15 times as many man-hours to produce as an automobile ring.

Another manufacturer maintains a surface finish of six micro-inches to meet the exacting standards of aircraft production. It is believed that some of these wartime piston-ring practices for aircraft will improve post-war passenger-car performance. All raw materials are thoroughly tested in the laboratory before use, as quality control is requisite. One company developed rings of special design for submarine Diesel engines to eliminate the telltale trail of oil that came to the surface with the exhaust. The piston-ring manufacturers also have pooled their technical research and engineering data in piston-ring development for the benefit of the war effort, a good example of unselfish cooperation in a field in which competition is unusually keen.

The automotive-bearing industry has expanded its

Trench mortars, relative simple in construction but deadly in effect, were used extensively in the South Pacific. The famed Bazooka is somewhat similar and accounted for many German tanks in Tunisia and Italy. This group from the 1st Filipino Infantry Battalion is practicing with a trench mortar prior to a go with the Japs. (U. S. Army Signal Corps Photo.)

The same companies which supply starting batteries for the automotive field are supplying similar units for planes, tanks, and submarines. When submerged, a submarine depends on storage batteries for propulsion and, in some instances, the batteries weigh as much as 162 tons. The Diesel engine used for charging is also a product of the industries, as are many other parts and units. Here an officer is looking through a periscope. (Official U. S. Navy Photo.)



IN THE WAR

which
own
now
an air-
standard
notive
takes
ers to

finish
ds of
these
prove
mate-
before
y de-
Diesel
came
manu-
h and
r the
elfish
nusu-
ed its

or the
s, and
storage
batteries
arging
ts and
Official

facilities greatly to meet the mounting war needs. Among the wartime products of one company are steel-backed, silver-lined, indium-coated sleeve bearings for aircraft engines, a set of which costs 175 times as much as the bearings for a popularly priced passenger car. Propellers, ranging in diameter from 8 in. to 9 ft., also are made for various types of naval vessels.

A major producer of roller bearings has developed a method for fabricating steel tubing into gun barrels that permits their manufacture 20 times as fast as under the old method of forging and drilling. This company produced 6000 gun barrels per month for 75- and 40-mm. guns by adoption of steel-tubing practices perfected over the last 18 years. The steel tube can be pierced in 15 sec. compared with 6 hr. required for boring the tube under the forging-and-drilling process. This company has doubled its electric-furnace melting capacity and installed \$1,500,000 in new machinery to meet augmented bearing demand. Another roller-bearing maker includes a 300-lb. type for gun trunnions and Navy catapults among its products.

Among the ball-bearing makers, one company is producing such bearings ranging in size from 0.000144 oz. to 1.41 lb. The minute type, 3000 of which will fill a thimble, are used in aircraft instruments.

One of the finest precision instruments being made by the automotive industry is the automatic pilot, which keeps a bomber on an even flight and straight course when making its bomb run. This device, which costs two and a half times as much as a fine motor car.



is being made in volume by a spark-plug and instrument manufacturer. The vertical main gyro contains 1527 parts and the azimuth unit includes 657 parts. Many of these are tiny gears, like those of a watch and tolerances range from .003 to .0003 in. The company put into operation the first conveyORIZED assembly of fine instruments, making mass production possible on a 24-hr. basis. Special electric testing-equipment was designed and built by the company engineers.

This same manufacturer of instruments and spark

Peacetime airplane engines presented no major difficulties to piston-ring engineers. But the speeds attained by present-day planes, top of page, driven by new engines and higher octane fuel, would ruin a set of the old-type rings in a single power dive. A special vote of appreciation should go to the piston ring men who solved that problem. (Official U. S. Army Air Forces Photo.)

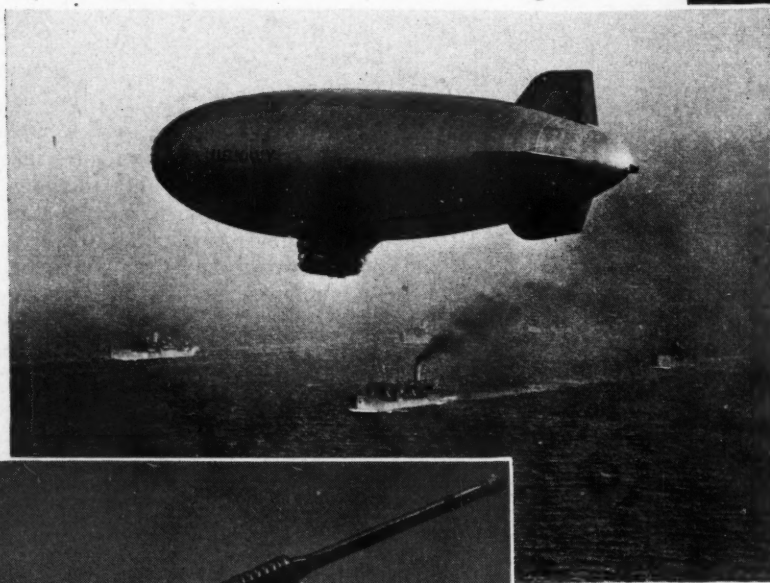
Germany took nearly ten years to prepare for this war only to falter at Dunkerque and Stalingrad. In about one-third the time the American automotive industries have surpassed the best the enemy had to offer, with the result that the beachheads at Kiska, Guadalcanal, Sicily, and Italy are things of the past and complete victory is just ahead. (Official U. S. Navy Photo.)



AUTOMOTIVE PARTS INDUSTRIES

plugs also has become one of the largest producers of machine guns in the country. When the order was received in September, 1940, few of the production men ever had had a close-up look at a machine gun. The first gun was assembled six months later. Machine operations were substituted for the arsenal hand-labor practices, an important time-saving factor when it is considered more than 3000 separate operations were involved in the manufacture of the gun. Company engineers redesigned or changed the material in 145 of the gun's 270 parts, making production short cuts and cost and material savings possible.

Another large manufacturer of automotive instruments and lubrication equipment has become one of the major sources of shell fuses for the Army. Its output was 3,000,000 fuses the first year, and now shipments are in astronomical quantities. Company engineers also redesigned a gasoline-burning automobile heater for use in high-flying bombers. This heater also was adapted to use in pre-heating aircraft engines to facilitate starting in cold climates and winter weather. Other war products include flame throwers, tank, aircraft and PT-boat instruments, field cooking

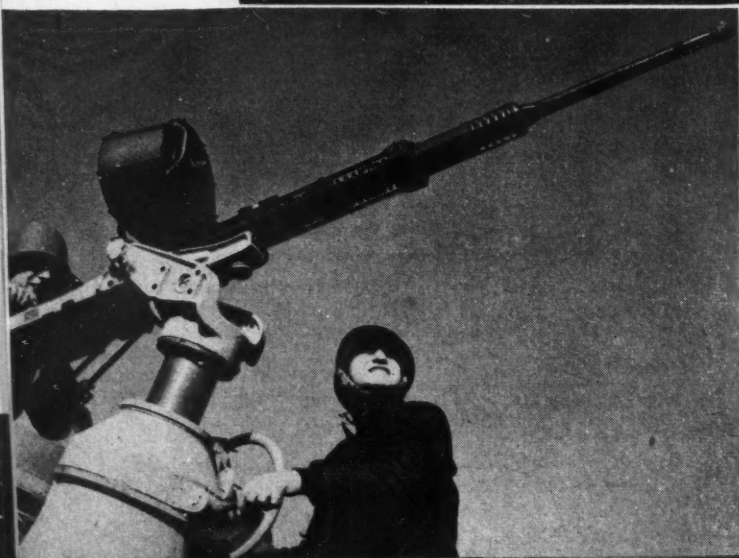


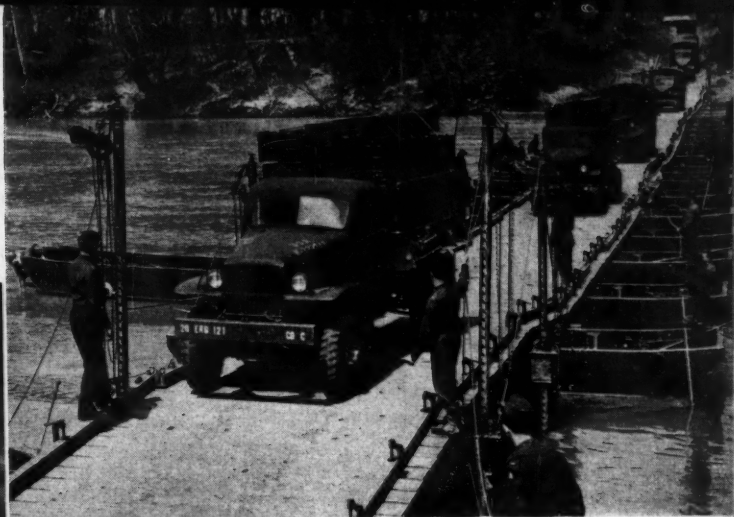
Convoys protected by blimps, airplanes, and surface craft carry munitions and men to all theaters of the global war. Virtually all the Navy blimp, guarding convoy at left against enemy submarines, was built by the automotive parts industries. It has been estimated these parts industries produced

ranges and radio parts.

Production of starters and generators for tanks and airplanes was undertaken by a parts plant that

formerly produced these items for automotive installation. One of the aircraft generators must produce enough current to light five homes. Starters for aircraft engines were among the war products added. A former producer of automotive electrical equipment and batteries is now operating a large aluminum foundry, furnishing engine-block and





more than \$2.5 billion worth of automotive replacement parts, equipment and accessories in 1942. (Official U. S. Navy Photo.) Anti-aircraft guns, lower left, were among the first pieces of equipment needed to keep our enemies away until we could arm ourselves for offensive warfare. Many parts for this 20 mm. AA gun, and its ammunition as well, were designed and built in automotive plants. (Official U. S. Navy Photo.) The liquid cooled 12-cylinder engines on the Navy patrol bombers, above, which

helped soften the Japs on Attu and Kiska, have four valves per cylinder. Improvements made by valve manufacturers in valve design have increased the engine-overhaul period from 100 to 550 hours. That's a big factor contributing to our air supremacy. (Official U. S. Navy Photo.) Parts for trucks, top of page, presented little difficulty to the parts and equipment industries, as they closely resembled similar units produced by these same companies during peace time.

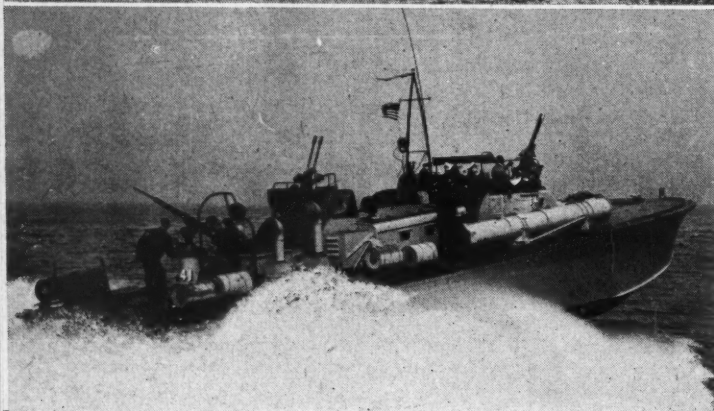
cylinder-head castings in great volume for a liquid-cooled aircraft engine. Precision parts, magnetos and pistons for this engine also are made by the company, while other war goods include aircraft ignition-harness, solenoids for bomb-release mechanisms and batteries for military vehicles.

Automobile-engine valve manufacturers are now heavily engaged in supplying the nation's military planes with millions of valves. Improvements in aircraft valves, many of them initiated by automotive parts companies, have helped increase the average engine-overhaul period from 100 to 550 hr. The sodium-

cooled aircraft valve, made from austenitic steel, stellite on the valve face, nitrided on the stem and with a tool-steel tip, has been a big factor in this improvement. A former automobile valve and fuel-pump producer now devotes 75 per cent of its output to furnishing more than 1000 aircraft parts. Seventy-five types of aircraft engine valves alone are on this list. A present-day four-engine American bomber requires 72 valves. New models may require up to 144. From 500 to 1000 different alloys were tried for aircraft valves but only five showed any promise. Three hundred machine operations are required in making these

AUTOMOTIVE PARTS INDUSTRIES

IN T



In addition to providing engine bearings for planes, tanks and trucks, one bearing manufacturer is providing propellers for naval vessels. PT boats, such as illustrated, have frequently proved a match for warships, airplanes, submarines and merchantmen. Power plant and armament are largely automotive parts industries produced. (Official U. S. Navy Photo.)

Brakes aren't the only units that are operated hydraulically. On a plane, the retractable landing gear, top, is operated by the same method and that takes a lot of fluid. To be sure that only clean fluid reaches the operating parts, the lines are provided with special filters produced by the same companies that supply oil filters for passenger cars. (Official U. S. Army Air Corps Photo.)

exhaust valves. Grinding operations which once required 30 min. are now performed in 36 sec. A magnaflex machine is employed to spot any valve defects. This company achieved peak output in the fifth month of production, eight months ahead of schedule. Another aircraft product of this company is a centrifugal electric booster-pump for high-flying planes, which raises fuel pressure, eliminates vapor lock and adds 13,000 ft. to a bomber's altitude.

Another manufacturer makes 30 types of aircraft valves, including some that are drop-forged, others extruded from alloy steel, and some of composite manufacture. One type requires three forging operations, with machining in between, totaling 125 operations in all. An aircraft valve requires 50 to 100 times as much labor as one for an automobile engine. The company is also making in its 11 plants 26 different items for airplanes, 20 for Army trucks, three for ammunition, 18 for tanks, eight for PT boats, five for anti-aircraft guns and 12 for scout cars. Among such items are volute springs for tanks, airplane propeller shafts and crankshafts, armor-piercing shot, combat vehicle axles and bilge pumps.

The storage-battery manufacturers have not had to vary their product with the war but merely to adapt it to wartime uses, for installation in tanks, airplanes and naval vessels. Aircraft batteries, incased in aluminum to minimize radio interference, must have great reliability and high amperage to meet the requirements of starting and take-off. Some of the marine batteries range as large as 162 tons, the size of a recent submarine installation.

Manufacturers of automotive jacks have stepped up

A high degree of maneuverability is making our tanks feared by the Germans and this ability depends not only on the power of the engine but also on the transmission, axles and transfer cases. When designing these units and their individual parts, the engineers used their experience in building similar units and parts for passenger cars, trucks and tractors. (Official O.W.I. Photo.)



IN THE WAR

their output considerably to meet augmented military and civilian demand. Every military vehicle, from a jeep to a tank transporter, carries a jack as one of the on-vehicle tools. In addition, the third and fourth echelon shops must have jacks to conduct maintenance operations. Tools include those for adjusting tank treads. Hydraulic jacks also are manufactured to facilitate the servicing and wheel removal on aircraft, from 6-ton types for fighter planes to 30-ton capacity for bombers and transports. One jack manufacturer utilized metal-fabricating experience to fill large orders for steel, water-tight ammunition boxes for the Navy. Another jack manufacturer is making hoists to position Navy flying boats on the end of the final assembly line.

Producers of automotive safety glass have turned their glass-making talents to developing glass and plastic enclosures that improve the visibility and safety for Army and Navy fliers. Bullet-resisting laminated glass is made for airplane windshields as well as for combat vehicle windshields and tank ports. Special curved-type rear-view mirrors are produced to aid the vision of fighter-plane pilots. Glass for anti-aircraft and ship searchlights also is an important item. This is a tempered plate glass, which also is used in port holes and pilot houses on warships and merchant vessels.

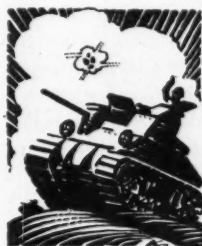
Muffler manufacturers must meet increasing replacement demand because the low driving speeds incidental to tire conservation have brought more rapid cor-

rosion of mufflers. The muffler makers also must help to meet the huge demands of the military-vehicle program. Special problems include amphibian-vehicle mufflers that will withstand salt water and mufflers for tank engines.

Manufacturers of anti-freeze of the permanent ethylene-glycol type must divert increasingly larger parts of their production to military aircraft for use as a coolant in liquid-cooled engines. Anti-freeze also must be provided for Army trucks and combat vehicles operating in Alaska, Iceland, Russia, China and Northern Europe.

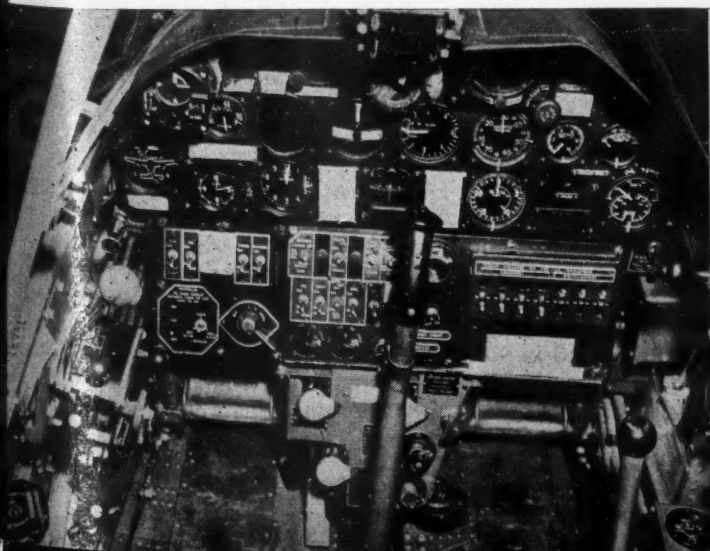
Automobile body manufacturers were confronted with a conversion picture different from that of the makers of engine components. They could not adapt their peacetime product to war purposes but they could utilize their productive "know-how," plant, machinery and skilled manpower to the manufacture of armaments. Thirty years' experience in the body business were behind one body company when it embarked upon the production of aircraft wings, and miscellaneous air-frame parts. This body company was the first to use automobile-production mechanical dies in the fabrication of airplane parts and the first automotive company to perfect the welding of aluminum alloys instead of riveting and have it accepted by the armed services. Experimentation on aluminum-alloy steel welding by the company had begun in 1933 as an outgrowth of the first automatic body steel welder in the industry developed in 1930.

Air-frame assemblies and parts are being shipped to 14 different manufacturers throughout the U. S. by this body company. In the manufacture of flame dampeners for heavy bombers, which eliminate the glow from the exhaust and help keep the plane's position hidden on night raids, the body company used converted automotive equipment for 95 per cent of the job. The company also produces intricate belly turrets for bombers in volume in a new plant. Due to the availability of craneways and the company's experience with steel welding, another contract for M-4 medium-tank hulls



"Praise the Lord and Pass the Ammunition" became popular early in the war and the fact that we now have ammunition to pass and guns in which to fire it is, in large part, due to the parts and equipment industries. Here ammunition is being passed to a Bofors gun on an American merchantman. (Official U. S. Navy Photo.)

Gages for engine speed, oil pressure, oil temperature, manifold pressure, fuel-pump pressure, and many other instruments are all necessary when hauling a load of bombs to Hamburg, or when taking part in a "dog" fight. The panel on this fighter is a good example of the number and variety of instruments that are being furnished for the Army and Navy by the accessory manufacturers of America. (Official U. S. Air Forces Photo.)



and the machining of the turret and other armor plate parts was assumed.

Another peacetime producer of automobile bodies, now making vehicle frames, also is an important source of aircraft-wing assemblies, engine nacelles and miscellaneous air-frame parts. This company has adapted the automobile power-driven assembly line to the mass output of air-frame parts with notable success.

Anti-aircraft searchlights also are being made by this body company. These lights, which can throw a beam 15 miles into the sky, had reflectors formerly made of aluminum but, with the increasing demands upon that metal for aircraft, company engineers redesigned the light to utilize steel stampings. This substitution saved 700 lb. of aluminum per searchlight. The engineers also utilized an 800-ton automotive die press to stamp out the reflectors.

A long-time manufacturer of wheels helped relieve the load on steel forgings by developing a steel stamping for end connectors on medium-tank treads. The wheel-company engineers developed a substitute stamping for the forging in four days. In addition to routine wheel production for jeeps and other military vehicles, this company also makes precision parts for aircraft engines, shells for the Navy, and aircraft wheels of steel stampings. The company foundry has been converted to casting turrets and armor plate. A new plant also was built for the manufacture of 30-caliber machine guns.

Another wheel company is now a major producer of artillery shells in various sizes, and has turned out millions of them. It took eight months to produce the first million, 55 days for the second million, and

only 45 days for the third million.

A large maker of wheel rims is now fabricating shatter-proof steel oxygen cylinders that provide sufficient air for the crews of high-altitude bombers. This plant also turns out machine-gun metallic belt-links in large quantities. A former manufacturer of fiber board and interior trim for automobiles is producing air-frame parts such as landing wheel doors for medium bombers. A new process for making soft dies for aluminum aircraft parts has been developed that cuts valuable hours off the time required for tooling up. A maker of molded-rubber products, which formerly included automobile running boards, has now switched to rubber tank-tracks.

One of the reasons for the high performance of the Army's all-wheel drive trucks is the fact that one of the major manufacturers of axles and transmissions carried on and actively assisted the Army in developmental work on such vehicles long before the war. Front-driving axles, rear-driving axles and transfer cases were specially designed, developed and tooled up to meet military specifications and then made available to vehicle manufacturers.

Altogether this company is making more than 4700 parts for ordnance, including tandem-axle bogies, brake drums, tank transmissions and final-drive units, as well as truck axles and transfer cases. The first contract for high-speed adapters for artillery carriages was finished 113 days ahead of schedule. Company engineers designed and developed the final-drive units for both the medium and light tanks and the M-5 light-tank final-drives are now being manufactured in volume. Among the special jobs it has been called upon to make is the six-

wheel drive train for the 13½-ton Army Air Forces crash truck. The complicated double-reduction axles, making possible 10 speeds forward and two in reverse, weigh more than many commercial vehicles.

Another axle and transmission builder worked closely with government arsenals and motor transport and ordnance officers on the development of Army vehicles before the war, and thus found no great difficulty in going into production of light-tank transmissions, hydraulic-torque converters, front and rear driving axles for jeeps and reconnaissance cars, and jeep



IN THE WAR



In order to keep them rolling through bamboo thickets, desert sands and Arctic snows, every automotive vehicle, from a jeep to tank transporter, carries a complete tool kit and jack. In addition, the various Army maintenance shops also must be fully equipped. (U. S. Army Signal Corps Photo.)

transfer cases, as well as the axles, transfer cases, clutches and power take-offs for military trucks.

In addition to the all-wheel drive, another device that has made it possible for U. S. Army military vehicles to operate over all kinds of terrain is the constant-velocity universal joint. During World War I, the vibration set up in Army trucks traveling over rough European block pavements reduced their efficiency and considerably shortened their operating life. The constant-velocity universal joint minimizes such vibration and thus greatly prolongs tire life and re-

duces breakdowns in the differential.

A company that had been at work on the problem since 1933 put some of its corps of engineers on the problem of adapting the constant-velocity joint to mass production. An improved and simplified design was perfected and special manufacturing machines to cut the ball

races for the universal joints were built. Then a forging was designed to escape the prohibitive machining costs in the former production methods.

The company had shown a new simplified power brake for commercial use on Dec. 7, 1940. Then came the Army needs and the first commercial units were turned over to Camp Holabird for operating tests. The simplified brake, with easier maintenance problems, was found satisfactory and shipments began in four months.

Carburetors for aircraft engines, an offshoot of original automobile

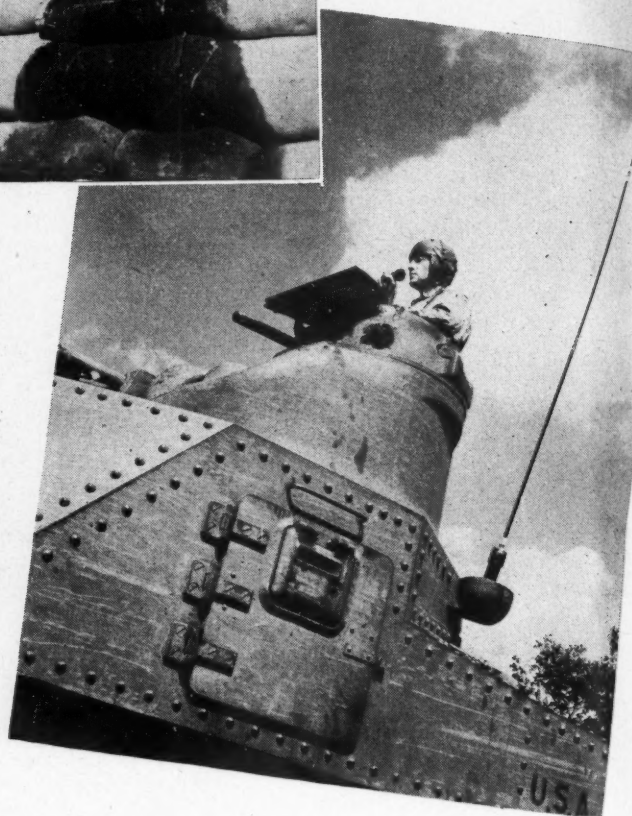
AUTOMOTIVE PARTS INDUSTRIES

IN THE

Without proper maintenance our planes, tanks, and trucks would not be able to carry the war to the enemy. Here two Army mechanics are working on a jeep. Note that the equipment is similar to that found in your shop. (U. S. Army Signal Corps Photo.)



Quantity production of gun barrels was one of the problems solved by a company whose peacetime product was anti-friction bearings. The parts industries are also largely responsible for the production of huge numbers of steel shell cases. (Official U. S. Army Signal Corps Photo.)



carburetors, are now one of the principal war products of the company. Four of the company's 25 plants are now devoted exclusively to the manufacture of airplane injection carburetors in 50 types. July carburetor output was greater than for the entire year 1940. Development work on this particular injection-type carburetor began in 1935, providing for the automatic metering of air and fuel under all atmospheric and

temperature conditions. The company's multitude of war products range from highly important radio equipment to 20-mm. aircraft cannon.

A large producer of automobile crankshafts is now making these items for marine, tank, truck and aircraft engines. One of the most difficult assignments is supplying crankshafts for a 14-cylinder air-cooled aircraft engine. This crankshaft has 30 separate parts



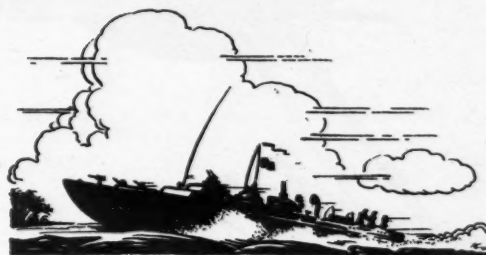
Communications have played an important part in every battle fought. At left a tank commander radios instructions to the rest of the unit. Note the similarity between the antenna on the tank and the one used on passenger cars. (Official U. S. Army Signal Corps Photo.)

Speed in the air as well as on the ground depends on keeping friction to a minimum. One manufacturer of anti-friction bearings provides 238 bearings for the high-altitude bomber above, which has proved so successful, particularly on bombing expeditions to Germany. (Official U. S. Army Air Forces Photo.)

One of the important problems that had to be solved by the automotive industries was that of material. When the Germans went into Russia and the Balkans, and the Japs into the South Pacific, it meant that new alloys and materials had to be developed to take the place of the ones used formerly. An analysis of the materials used in the construction of this half-track, top right, would show clearly that this problem was successfully solved. (Official U. S. Army Signal Corps Photo.)

and requires 607 machining operations, with more than 100 dimensions held to .001 in. or less.

Formerly making automobile steering gears, a factory has been converted to the manufacture of machine guns and .30-caliber carbine rifles. This plant made the first machine gun ever ordered by the government outside the Eastern small arms industry. When Army demands for a small, maneuverable rifle



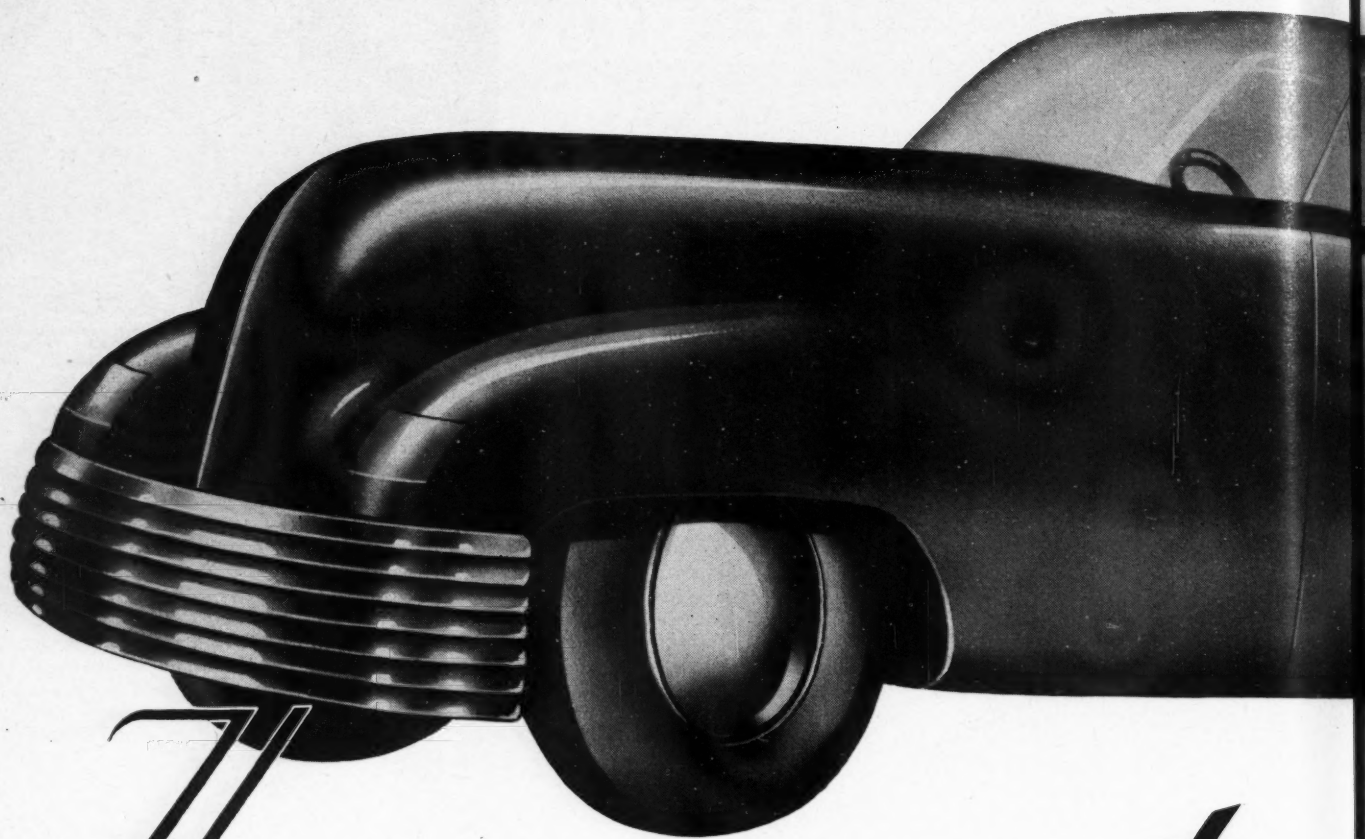
for use in jungle warfare or by paratroopers became urgent, this plant switched part of its production to the new weapon, which weighs only 5¼ lb.

A company which was among the pioneers in the manufacture of automobile engines for various passenger-car builders has become the largest U. S. producer of tank engines. An outmoded plant which was up for auction in 1939 was renovated, retooled, and put into volume production of radial aircraft engines for installation in M-4 medium tanks nine months after revamping of the plant began. Other war products include marine and military-vehicle engines, small aircraft engines, and portable generators for field hospitals.

One of the largest organizations in the automotive-parts field, a major source of transmissions, gears, clutches, radiators and carburetors for the industry, has 25 plants engaged in turning out war materials on more than \$400 million in war orders. A plant that formerly produced 40 per cent of the timing chains used in the automobile industry now is making drive chains for 20-mm. anti-aircraft guns, and ammunition hoists. A spring division used its knowledge of spring steel to make improvements in clips for a semi-automatic rifle. Twenty-six changes in design were suggested by company engineers. Adoption of these changes by the government resulted in savings estimated at \$3,000,000 on all clip orders.

This company was one of the first to get into production of tank components, shipping tank clutches as early as February, 1940. Other tank parts being pro-

(Continued on page 80)



The **INDUSTRY'S DEBT TO** *Parts*

Inventive genius of men making parts, materials, supplies, accessories, shop equipment, and tools has contributed much to development of the modern car

By JULIAN CHASE

THE extent to which our parts, accessory and materials manufacturers have contributed to the development of the automobile is something that cannot be adequately expressed. It can be said, however, that the scope and variety of their contributions are so great as to be almost, if not quite, pre-

ponderant. If, with an intimate knowledge of the history of automobile development, we look analytically at one of our many millions of present-day motor vehicles, we see that it is to a very large degree the embodiment of skillfully adapted ideas and products which have grown, over a long period of

years, from the inventiveness, research, vision and courage of specialty producers.

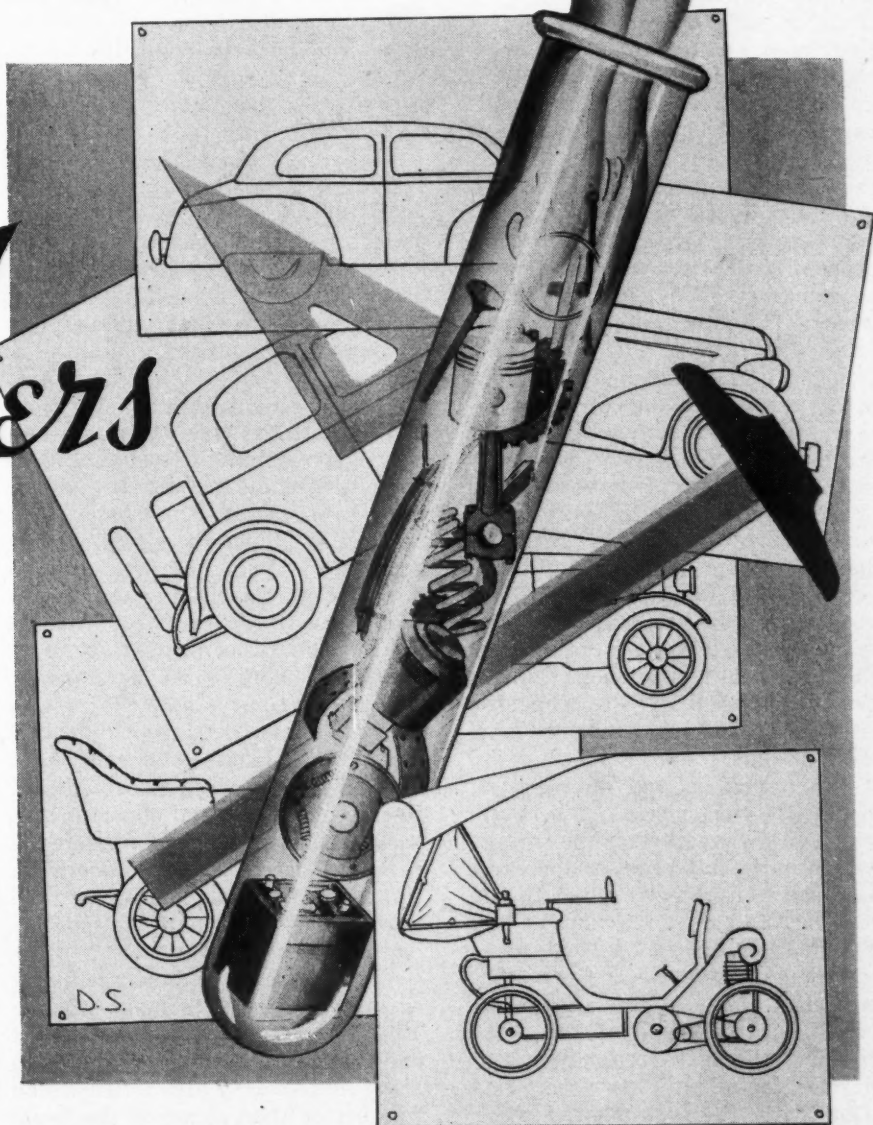
The parts, accessory and materials manufacturers have made available, in striking number and variety, the things which provide the safety, comfort, ease and consistency of operation, the durability and extraordinary performance of today's automobile. They have introduced a large percentage of the new ideas which, over a long stretch of time, have been built progressively into our automobiles. They have brought their contributions to the complete vehicle manufacturers in such high qualities and such large quantities that they could be

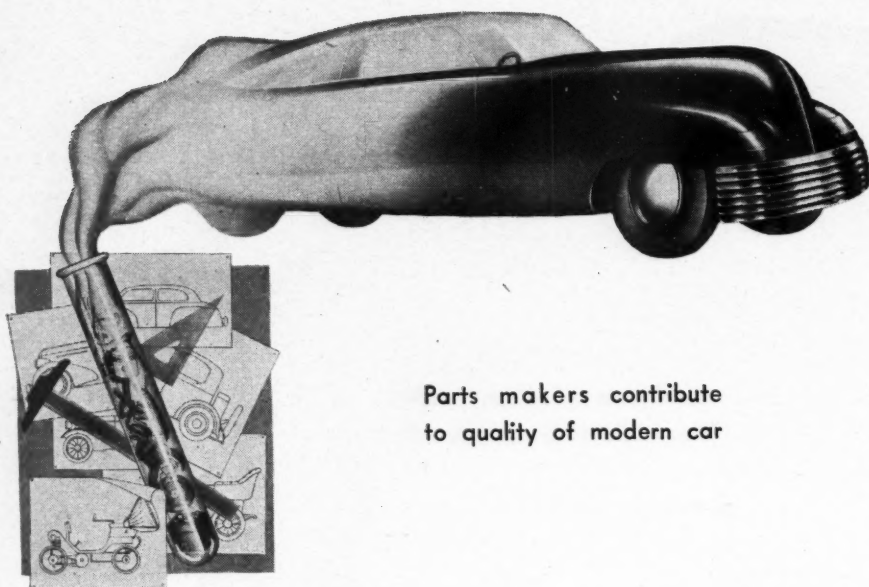
Makers

incorporated into the finished product at costs which made for lower final prices and greatly widened markets.

The engineers and others in the complete vehicle plants, supplementing their own primary activities, have done the important, the indispensable work of selection, adaptation, refinement and coordination. With the enormity of the doubled task they have been fully occupied and the close approach to perfection which has been attained in the finished job is a glorious and gratifying testimonial to their intelligence and skill.

Perhaps no one will deny that this generalization is a fair state-





Parts makers contribute to quality of modern car

ment of the case. If anyone should doubt it, it is safe to say that he is not one of those whose intimate knoweldge of the advance of automotive design goes back to the days when cylinder castings were made with a grain structure approaching the coarseness of that of a drinking fountain for horses, when automobile frames were made of bicycle tubing, when transmission gears either mashed or chipped after a few shiftings, when ignition systems were mostly of the make-and-break variety with dry cells as a source of current, when brakes were simple, one-way bands with leather linings. Certainly he does not date back to the still earlier period when some pioneers, at least, found it necessary even to form up the plates of the storage batteries which they hoped would provide sufficient EMF to propel the crude electrical materializations of their dreams.

The ingenious and enterprising mechanics with visions of a horseless age, who started the things which, in the late nineties and early nineteen hundreds, resulted in the real beginning of the automotive industry, had their nucleal ideas and their nebulous dreams but nothing with which to work them out except the materials of the stove foundry, the blacksmith shop and bicycle factory. They struggled alone with their problems which



were practically all-inclusive. There was no one to provide even the better materials which they needed. They, themselves, did not know what these materials should be. They could not have written the specifications for them if they tried. There was no one to hand them ready-made parts, such as steering knuckles or axles or crankshafts or radiators or universal joints or even proper anti-friction bearings.

They took the rough and inadequate castings which the local and relatively unenlightened foundryman turned out. With the aid of the engine lathe, the shaper, the milling machine, the single-spindle upright drill, the blacksmith's forge, cold chisel, file and emery cloth, they fashioned and finished almost all of the parts they used. But they worked on persistently and courageously, and the results of their efforts attracted the attention of specialists who saw what was ahead and were smart enough to capitalize potential opportunities for themselves as they rendered a real and needed service to others. That was the beginning of the parts, accessory and automotive materials business.

While the early automobile builder was struggling to make his engine give him the power he needed and hoped to get, someone came along and showed him a tire which was better than those of the hose-

pipe variety which he had hitherto been forced to use. Later he was handed the removable rim, and still later, the metal and demountable wheel. While he was working on the problem of laying out his assembly to get some degree of efficiency and accessibility, someone offered him a complete ignition system much superior to the one which he had devised. Someone else said "Here's a radiator", another, "Here's a frame", still another, "Here's a brake". A salesman from some material fabricating plant came to him and told him that now he could get more strength for this or that part with much less weight—greater toughness and longer wear.

The floodgates of invention were gradually opened and our automobile builder was almost swamped. Tops and windshields, engines, carburetors, mufflers, clutches, universal joints, engine valves, pistons, rings, transmissions, fans, fuel-feed systems, speedometers, self-starters, electric lights, closed bodies, steel bodies, alloy steels, light metals, bearings of all kinds, rear axles, air cleaners, steering gears, shackles, lacquers, chrome plating, shock absorbers, brake lining, oil filters, safety glass and what not were poured upon him. We make no effort either to name all of the things which came to him or to set them down in the order of their appearance.

As the number of automobiles on the roads increased, the problem of servicing them became acute. New tools and new equipment, special tools and special equipment were needed and the growing need was met first with a trickle and later with a flood of products on which another important branch of the industry was founded. Quicker, better service jobs were rendered possible and a further vital contribu-



tion to motorized highway transportation was made.

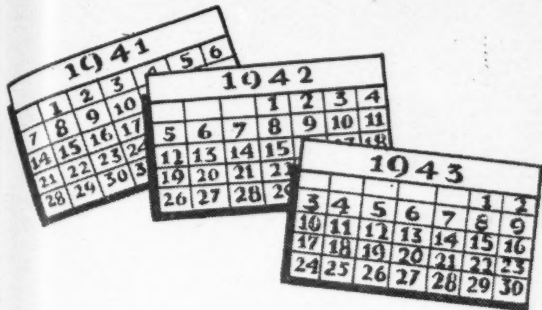
Where there was and is one shop turning out complete automobiles, there were and are hundreds in which specialized ability and experience, work, worry and wealth are turned into things which make automobiles better.

In the early days, there was ready and quick acceptance by the auto-

(Continued on page 70)

CHRONOLOGICAL RECORD of

WPPB AUTOMOTIVE PARTS AND MATERIAL CONSERVATION ORDERS



This tabulation lists all the limitation and conservation orders affecting the production of automotive parts and equipment issued since Sept. 12, 1941, three months before Pearl Harbor. The first orders were issued by OPM, predecessor of WPPB.

1941

Sept. 12—Limitation Order L-1-a: **PRODUCTION OF FUNCTIONAL REPLACEMENT PARTS FOR MEDIUM AND HEAVY TRUCKS** for the period from Sept. 1 to Nov. 30, 1941, was limited to 60 per cent of such parts sold by the manufacturer for replacement from Jan. 1 to June 30, 1941. An A-3 preference rating was granted for material for such production.

Sept. 18—Limitation Order L-4: **PRODUCTION OF FUNCTIONAL REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** from Sept. 15 to Dec. 31, 1941, was limited to 60 per cent of such parts sold by the manufacturer for replacement from Jan. 1 to June 30, 1941. An A-10 preference rating was granted for material for such production.

Oct. 12—Amendment to L-1-a: **PRODUCTION OF FUNCTIONAL REPLACEMENT PARTS FOR MEDIUM AND HEAVY TRUCKS** from Sept. 1 to Dec. 31, 1941, was limited to 80 per cent of such parts sold by the manufacturer for replacement from Jan. 1 to June 30, 1941.

Oct. 21—Conservation Order M-9-c: **USE OF COPPER AND COPPER BASE ALLOYS IN THE MANUFACTURE OF GARAGE AND AUTOMOTIVE REPAIR EQUIPMENT, HEADLAMPS, HEATERS, HORNS, HUB CAPS AND REAR-VIEW MIRRORS** until Jan. 1, 1942, was limited to 60 per cent of a 1940 base period. Thereafter, the use of copper in such articles was prohibited. Use of copper in all other parts was limited to 70 per cent of a 1940 base period.

Oct. 27—Limitation Order L-2-b: **USE OF COPPER, NICKEL, CHROME OR ALUMINUM IN "BRIGHT WORK, BRIGHT FINISH," METAL FINISH OR BODY TRIM FOR NEW PASSENGER CARS** was prohibited after Dec. 15, 1941, but minimum practicable quantities of these materials were permitted for the plating of bumpers and bumper guard assemblies.

Nov. 6—Amendment to L-1-a: **PRODUCTION OF FUNCTIONAL REPLACEMENT PARTS FOR MEDIUM AND HEAVY TRUCKS** from Sept. 1, 1941, to Jan. 31, 1942, was limited to 100 per cent of such parts by the manufacturer for replacement from Jan. 1 to June 30, 1941.

Nov. 14—Limitation Order L-4-a: **PRODUCTION OF FUNCTIONAL REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** for January, 1942, was limited to one-third of such parts, by the manufacturer for replacement from Jan. 1 to March 31, 1941.

Nov. 20—Amendment to L-2-b: **WINDSHIELD WIPER ARM AND BLADE ASSEMBLIES, LOCKS AND LOCK COVERS, VENTILATOR WINDOW LATCHES AND BODY-TRIM SCREWS** were exempted from the provisions of the order prohibiting use of copper, nickel, chrome or aluminum in body trim for new passenger cars and the effective date of L-2-b was postponed until Dec. 31, 1941.

Nov. 22—Amendment to L-4: Manufacturers of **FUNCTIONAL REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** were given a choice of base periods, either Jan. 1-June 30, 1941, or July 1-Dec. 31, 1940, upon which to figure their parts quotas for Sept. 15 to Dec. 31, 1941.

Dec. 31—Conservation Order M-43-a: Use of tin in **AUTOMOBILE BODY SOLDER** was prohibited after April 1, 1942. Its use in automobile parts and bearing metals was limited to 40 per cent of the amount used in the corresponding quarter of 1940, except in bearing metals having a rating of A-3 or higher. In latter more could be used if substitutes were impracticable.

1942

Jan. 23—Amendments to L-4 and L-4-a: Production of **FUNCTIONAL REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** for the first half of 1942 was limited to 150 per cent of the number of each of the replacement parts sold for replacement during 1941. Replacement parts were defined as engine, clutch, transmission, propeller shaft, axles, brakes, wheels, hubs, drums, starting apparatus, spring suspensions, brackets and shackles, the exhaust, cooling, fuel, lubricating, and electrical systems, including generators, lights, reflectors, and batteries; gages, speedometers, motors, fuses, flares, directional signals, rear-view mirrors, windshield wipers, control mechanisms, steering apparatus and driving gears.

Jan. 23—Limitation Order L-35: Production of **FUNCTIONAL REPLACEMENT PARTS FOR MEDIUM AND HEAVY TRUCKS** from Jan. 1 to March 31, 1942, was limited to 60 per cent of the number of each of the replacement parts sold for replacement from July 1 to Dec. 31, 1941.

March 5—Amendment to L-35: Production of **FUNCTIONAL**

REPLACEMENT PARTS FOR MEDIUM AND HEAVY TRUCKS from Jan. 1 to June 30, 1942, was limited to 75 per cent of the number of each of the replacement parts sold for replacement during 1941. For the nine months ending Sept. 30, 1942, such parts production was limited to 112½ per cent of the 1941 total and for the calendar year 1942 such parts output was limited to 150 per cent of 1941 parts sales.

Feb. 28—Amendment to Conservation Order M-15-b. Use of crude rubber in **AUTOMOTIVE FAN BELTS** was limited to 30 per cent of the average monthly consumption during the 12 months ending March 31, 1941. Use of crude rubber in certain automotive parts, such as **HYDRAULIC AND AIR BRAKE PARTS, specified BUSHINGS, GASKETS, ENGINE MOUNTINGS AND WINDSHIELD WIPER BLADES** was limited to 75 per cent of the average monthly consumption in the year ending March 31, 1941.

April 6—Limitation Order L-63: Inventories of **AUTOMOTIVE SUPPLIES** in the hands of wholesalers, jobbers, dealers or retailers in the Eastern and Central time zones were limited to twice the dollar value of sales of such supplies which were shipped from stock in the second preceding calendar month. Suppliers in other time zones were allowed inventories equal to three times the value of such sales. Suppliers with an inventory at cost of less than \$20,000 were exempted from the order.

April 25—Limitation Order L-4-b: Production of replacement **STORAGE BATTERIES FOR PASSENGER CARS AND LIGHT TRUCKS** from April 1 to Sept. 30, 1942, was limited to 75 per cent of the number of batteries sold during the corresponding period of 1941. Number of battery sizes and models were reduced from about 75 to 15 in specified minimum ampere-hour capacities. Turn-in of a used battery was required on every new battery sale and producers were limited to a 60-day inventory based on the corresponding 1941 period.

May 2—Conservation Order M-126: Use of iron and steel in the manufacture of automobile **ACCESSORIES AND NON-FUNCTIONAL PARTS**, except as required by law, and garage hoists, was prohibited after a 90-day period.

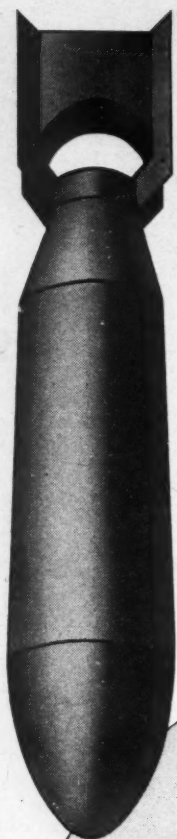
May 5—Limitation Order L-4-c: Production of **FUNCTIONAL REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** from April 1 to June 30, 1942, and from July 1 to Sept. 30, 1942, was limited to 70 per cent of the total dollar volume of replacement parts sold in the corresponding quarter of 1941. Universal joints, shock absorbers and windshield-wiper motors were added to the list of functional replacement parts. During the third month of each quarter, a producer was prohibited from having a dollar value finished-parts inventory more than four times his average monthly sales during the preceding quarter.

May 6—Limitation Order L-106: **COPPER AND COPPER-BASE ALLOY PARTS** were prohibited from use in all except essential operating parts, such as electrical equipment, carburetor parts, gaskets, zinc die castings for fuel pumps, and copper lead bearings. Copper content of radiators was limited to 71 per cent of previous usage.

June 17—Limitation Order L-128: Production of **EXHAUST VALVES** was limited to the two-piece welded-head type and maximum amounts of chromium and nickel were specified for the head. This limitation was 9 per cent chromium and no nickel for passenger car and light truck valves, 21 per cent chromium and 1½ per cent nickel for medium and heavy truck valves, 20 per cent chromium and 9 per cent nickel for trucks with engines over 300 cu. in. piston displacement.

July 4—Limitation Order 158: Production of **REPLACEMENT PARTS FOR PASSENGER CARS AND LIGHT TRUCKS** during the third and fourth quarters of 1942 was limited to 70 per cent of the parts sold by the manufacturer during the corresponding quarter of 1941 unless the inventory of finished parts in the third month of the quarter exceeded four times the average monthly sales during the preceding quarter. If more than a four-month inventory was on hand, production was limited to 50 per cent of the parts sold during the corresponding quarter of 1941, with the proviso that total parts inventory at the end of each quarter could not exceed such inventory at the beginning of the quarter.

(Continued on page 74)



TUNE-UP **for** **War and** **Winter**

Seasonal service this fall assumes a new importance, since the goal is not merely good cold-weather performance but also cars that will outlast war

WHEN servicing the nation's motor vehicles this fall, MOTOR AGE readers must prepare them for cold-weather driving and must also see that they operate in the most efficient manner in order to get the utmost out of each gallon of gasoline and also from each tire. In other words, these cars must be serviced for war and winter.

The maintenance of the nation's 30,000,000 motor vehicles—trucks, buses and passenger cars—is one of the most important and difficult jobs of the war, which is not made easier by the scarcity of parts, mechanics and equipment. However, it is a job that must be done and which can't be neglected or precious gasoline, rubber and complete vehicles will be wasted.

The job of preparing a car for war and winter driving can be divided, in general, into four parts—general engine tuning; preparation of cooling system; checking of tires and wheel alignment; and lubrication. All these are important and not one can be neglected.

When tuning the engine, the first step is to check compression and compare the value of each cylinder with the factory specifications. It



By **BILL TOBOLDT**

must be remembered that no amount of carburetor adjustment or other tuning will improve the operation of an engine if the compression is below standard. Therefore, if the compression is more than 10 per cent below factory specifications, the engine should be given a carbon-and-valve job and, if piston rings are worn, these should be replaced. However, in many instances, compression loss may be due to stuck valves and in many cases this trouble can be overcome and engine performance materially improved by using special oils and compounds which will free the valves and rings. If the compression is not restored to normal by this procedure, it then becomes necessary to grind valves and install new rings.

Compression having been restored, the next step is to rebuild the ignition system. In this connection, it is not sufficient simply to adjust breaker-point gap. That is, of course, important but, unfortunately, too many mechanics are inclined to limit their ignition work to breaker points. In addition, the distributor-shaft bushing must be checked for wear; the automatic advance mechanism, both

centrifugal and vacuum, must be checked, preferably on an ignition test stand, to make sure that the correct advance is obtained at all engine speeds.

Of course, the centrifugal-advance springs must be free, with the springs of the proper tension, and the advance plate must not be worn and the vacuum advance unit must be in good condition.

Spark plugs should be cleaned and regapped and, if necessary, a new set installed. Make sure that ignition coils and condensers are in good condition by checking them on a test stand. Also carefully examine the ignition cables to make sure that the insulation is in good condition.

Particular attention should be given to the battery, battery cables and electrical equipment to insure easy starting during the cold winter months. This is especially important on cars which are limited to an "A" ration book, for under such conditions the car is not driven

sufficiently to maintain the battery in a fully charged condition. Generators and charging regulators should, therefore, be adjusted to a higher charging rate so that the specific gravity of the starting battery will be maintained at 1.250. It is also imperative that the battery and engine grounds be cleaned and in good electrical condition and also the battery terminals.

Cleaning and adjusting the carburetor is an important part of the winter tune-up job. Maximum economy will be obtained only when all jets and passageways are clean and with the float set at the proper level.

By leaving the carburetor accelerator pump on the summer, or short-stroke setting, better than usual winter economy will result. However, some performance will be sacrificed.

Work on the carburetion system is not complete unless the automatic choke is examined to make sure it is in the fully open position when the engine reaches operating temperature. Because tappets on L-head engines are rather difficult to reach, many mechanics are inclined to ignore them, claiming that, as a

(Continued on page 68)

THE Japs captured Burma and the South Pacific islands for two reasons; first, because they wanted that rubber-raising territory and, second, because they realized that its capture would paralyze, or at least help to paralyze, the American transportation system and consequently would injure our war-producing facilities.

That they were not wholly successful in crippling automotive transportation is, in a large measure, due to the efforts of MOTOR AGE readers in aligning and balancing wheels and straightening frames.

While the country's rubber industry, with its 40 new plants for producing synthetic rubber in operation, promises civilians plenty of rubber for essential use by the end of the year, we still have to make the tires that are now in service last until this new rubber becomes available. The only way this can be accomplished is by periodic checks on wheel alignment and wheel balance. These checks should be made at least twice each year.

To have a perfect-steering vehicle with minimum tire wear, each of the following items should be checked on every job: Caster, camber, toe-in and toe-out, king-pin inclination, shock absorbers, tire inflation, axles and frames for bends, independent front-suspension arms and supports for bends, all steering-system bushings and pins for wear, brakes, front-wheel bearing adjustment and wheel balance.

Before making any check on steering geometry, the tires should be inflated to the correct pressure. The car should then be placed on a level floor or rack. Next determine if the frame is the same height from the floor on each side, both front and rear. If it is not, the condition may be caused by weak springs, and this should be corrected before making any steering adjustments. Now determine if the wheelbase is the same on each side. Measure from the center of the rear axle-shaft to the center of the front-wheel spindle on each side to determine any difference in wheelbase. If any difference is apparent, check the frame and the front axle or front-suspension parts for bends.

Caster, camber, toe-in, and turning radius should now be checked and any correction necessary be

Wheel balance is one of the most important items that affect both steering and tire wear. The wheels,



UNEVEN OR SPOTTY TIRE WEAR

Under-inflated Tires
Incorrect Camber
Grabbing Brakes
Uneven Caster
Wheel out of Balance

CAR PULLS TO ONE SIDE

Unequal Camber
Unequal Tire Inflation
Bent Frame
Bent Spindle
Unequal Caster



EXCESSIVE OR RAPID TIRE WEAR

Under-inflated Tires
Unequal Camber
Misaligned Frame
Bent Axle or Front Suspension Parts
Incorrect Toe-In
Incorrect Turning Radius
Uneven Caster

SHIMMY

Under-inflated Tires
Defective Shock Absorbers
Loose King Pins
Bent Spindle
Loose Shackles
Too Much Caster
Wheels out of Balance



WANDER

Tight Steering
Under-inflated Tires
Insufficient Caster
Loose Wheel Bearing
Out-of-balance Wheel

HARD STEERING

Tight Steering Gear Adjustment
Tight King Pins
Bent Spindle
Too Much Caster

WHEEL ALIGNMENT Keeps 'em Rolling

Present-day conditions make it imperative to check and adjust front ends with utmost care

tires and brake drum and hub assemblies should be tested for both static and dynamic balance.

While shock absorbers are not part of a wheel-aligning job, they are one of the main factors affecting tire wear. Defective shock-absorber units allow the wheels to bounce excessively on rough roads and, when the tire strikes the road

surface on the rebound, the spinning action of the wheel removes a large amount of rubber from the tire. Inoperative units should either be refilled with the proper type of fluid or should be replaced.

Accompanying this article is a list which will aid the mechanic when doing a job of trouble shooting on misaligned wheels.



"*!!? ❏ **! This is the last straw—you coming in here with a complaint about the repair job you did on your own car!"

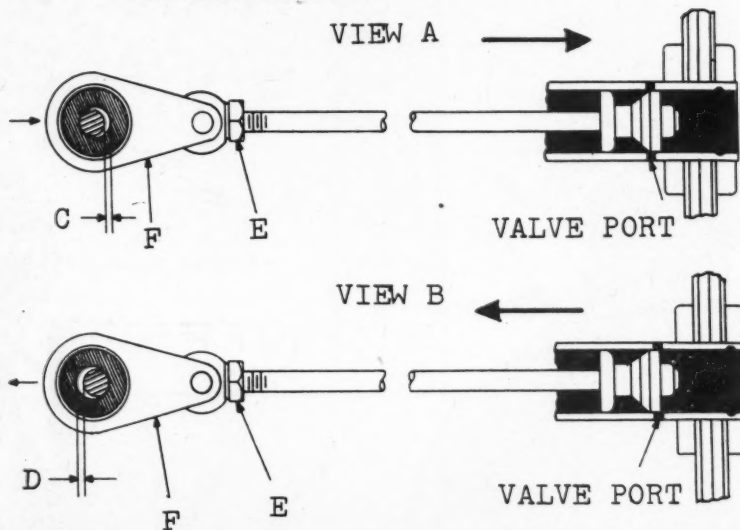
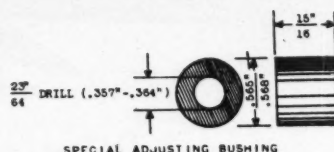
1. Checking operating valve adjustment with special adjusting bushing.

2. Brake-pedal, master-cylinder, and power-cylinder hook-up.

3. Sectional view of power cylinder and valve-rod setting dimension.

4. Operating-valve positions of power cylinder for various pedal applications.

By **BOB TURNER**



Adjusting G.M.C. TRUCK BRAKES

THE brakes used on G.M.C. models AC 500 and 550 are a conventional-type two-shoe hydraulic system, actuated through the use of a reactionary-type power brake cylinder. The brake shoes are adjusted in the conventional manner by turning the cams located on the backing plate. Eccentric-type anchors are used on the shoes for centralizing when doing a major adjustment.

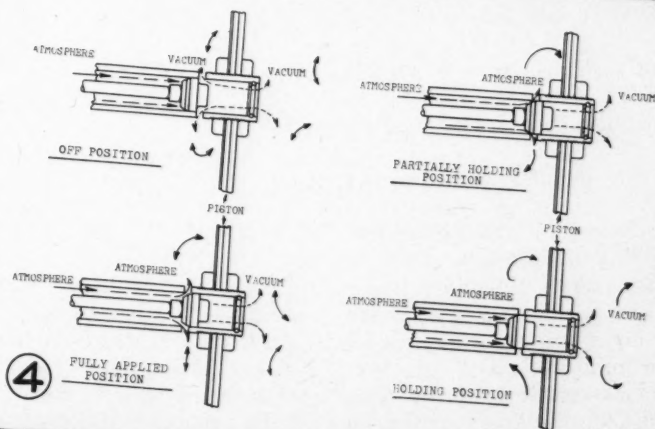
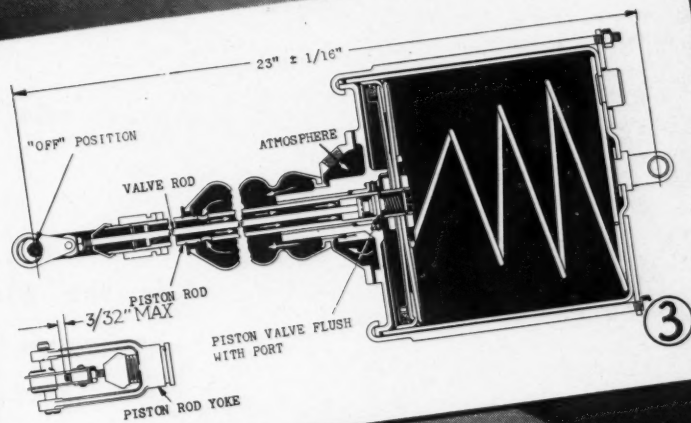
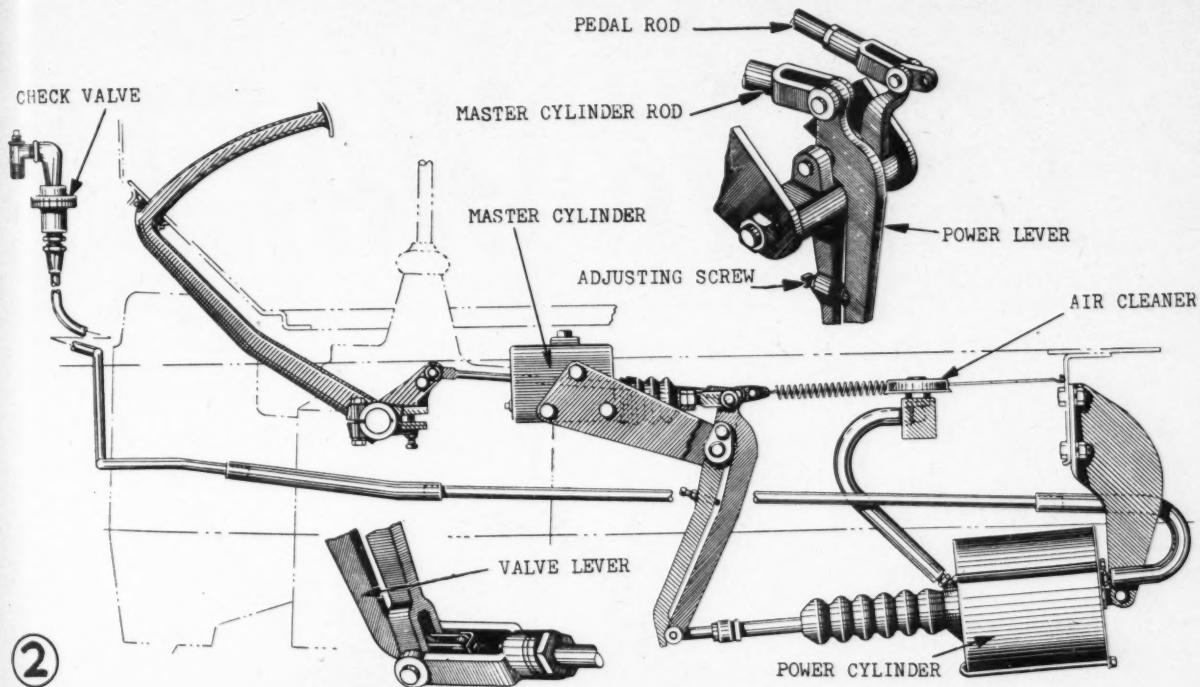
As the most important adjustment in this brake system is the linkage, the following instructions for this adjustment should be followed explicitly:

With the power cylinder mounted in the truck, connect the power and valve lever to the power cylinder piston rod yoke, Fig. 2. Make sure the valve-lever set screw is backed off far enough so it does not touch the power lever, Fig. 2. With the operating valve in the off position, Fig. 4, connect the pedal rod to the valve lever, Fig. 2. Be sure the brake pedal is against pedal stop. Tighten the pedal-rod-yoke lock nut. The brake pedal movement should now be $\frac{1}{4}$ to $\frac{3}{8}$ in. before brakes begin to apply.

Now, with the operating valve in the fully applied position, Fig. 1,

Following this procedure on Models AC 500 and 550 saves you time and labor

view "A," squeeze the power and valve lever, Fig. 2, together with the fingers and the set screw finger tight against the power lever. Tighten the set-screw lock nut. With the operating valve in the fully applied position, Fig. 1, view "A," and the power and valve levers, Fig. 2, held together with the fingers against the set screw stop, connect the master cylinder piston rod to the power lever. Adjust the master-cylinder yoke by rotating the piston rod until contact is made with the piston. Tighten the piston-rod lock nut. The piston-rod floats in the piston and this adjustment should provide just the right amount of play in the master cylinder. Care should be exercised to see that the piston cup clears the bleeder hole in the master cylinder with brakes in the "off" position.



The power-cylinder operating valve adjustment can be checked on the truck and is done with the engine running at idle speed. This adjustment must always be made after the piston-rod yoke has been set to its proper position. The dimensions for this position are given in Fig. 3. Place the special adjusting bushing shown in Fig. 1 in position in the valve yoke as shown in view "A," Fig. 1, and insert the piston-rod yoke pin in position. With the vacuum from the intake manifold of the engine present in the power cylinder, move the valve-rod yoke toward the cylinder until the adjusting bushing touches against the front side of the piston-rod yoke pin. All clearance should be toward the cylinder as shown at "C," Fig. 1. Due to spring pressure on the valve, a slight outward pressure must be exerted on the piston rod while moving the valve inward, or toward the cylinder, so that any movement of the piston rod will be due to the admission of atmospheric pressure through the piston-rod valve port and not from spring pressure on the valve-rod yoke. In

(Continued on page 98)

New Life for

CRANKSHAFTS

HORACE WATIKINS, grimy as if he had just crawled through a crankcase, shuffled into the shop office and waited politely until Pop O'Neill had finished posting the previous day's shop orders to the books.

"Got all your notes paid at the bank?" asked Horace.

"Never had no notes at the bank. Why?"

"Then it's all right, I guess."

"When I want to play guessin' games, I'll go on a radio quiz show," said Pop a little sourly. "What've we got to do with the bank?"

"Well, Caleb Spender is the cashier, and we've got his wife's old crock in the shop, and he's gonna have to spend some money on it—at last."

"A ring job ain't gonna break him, is it?"

"Only his heart," said Horace. "But the trouble ain't rings. I just made an oil test, and the oil's pourin' outa the bearin's like beer out of a bung hole. It needs a bearin' job."

"You're sure it's bearin's?" said Pop.

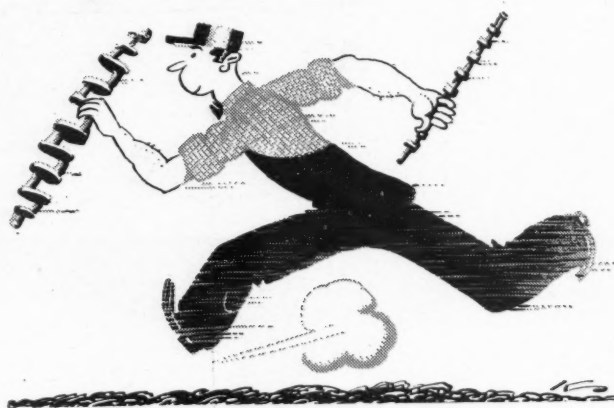
"Of course, I'm sure. What else could it be?"

Pop rubbed his chin meditatively.

"Well, the journals could be outa round, too."

"The sun might get up in the west, too," said Horace, "but it don't. Old Mrs. Spender never drives that car more'n twenty miles an hour and she changes oil every five hundred miles."

"But a crankshaft ain't Old Man River, Horace. It don't just keep rollin' along forever. That car's almost seven years old. I think we better put the mike on the crankshaft."



In the 23d article of a series for beginners, Pop O'Neill describes a way to combat material shortages by applying up-to-date salvage methods

By J. EDWARD FORD

"You're the boss. But I got an awful lotta work to do."

"If you worked as hard as you worry," said Pop, "I could fire the rest of the men."

He reached down a soiled and dog-eared book of specifications, and opened to the page he wanted. "The crankshaft-journal diameter on that job is 1.937," he said.

"Suppose you slip off one of the big ends while I finish up here. I'll be out in a minute."

When he went out into the shop with a micrometer, Horace was crawling out from under the Spender distaff car. "That journal looks all right to me," Horace said.

"They used to fix buggies by sight," said Pop, "but things 've



THE MOTOR AGE

BASIC COURSE for MECHANIC TRAINING



After he had squinted at the micrometer, Pop grew thoughtful.

progressed since you busted into the game. We like to measure journals nowadays. Let me get under there and have a look."

It was not a pleasant job for Pop. Old joints protested when they were forced into cramped positions, but Pop doggedly, if a little slowly, crawled under the car. "Shove that light under," he said.

After a minute or two he emerged slowly and got stiffly to his feet. He squinted at the micrometer, and Horace craned his neck for a look.

"Well, what's it say," Horace asked.

Pursing his lips a moment, Pop was thoughtful. Then he said, "It shows 1.928. That's nine thousandths less than it ought to be."

Horace opened his mouth to remark that nine thousandths did not seem like a great deal but Pop interrupted him. "But that's only half the story," he said. "Measured another way, the journal is 1.936. In other words, it's eight thousandths out of round. It wouldn't do much good to just install new

(Continued on page 67)

DEALER Business Booms With Used Cars

Shrewd buying builds up select stock and painstaking reconditioning keeps units moving at a good profit in a brisk but highly competitive market

A YEAR ago, automobile dealers in the Middle West were viewing the future with some doubt. After nine months of wartime restrictions, they had just about adjusted themselves to the new conditions when gasoline rationing, already an old story in the East, was imposed on the rest of the country. Experience in the East had shown that moderate rationing was not fatal either to the sale of used cars or to service business, but the Middle West still had to learn for itself, and many dealers were decidedly bearish about the prospects of either phase of dealer business.

An exception was Edgar Fitzpatrick, Pontiac dealer on the South Side of Chicago, who foresaw an increasing demand for used cars. On October 1, 1942, he had only 56 used cars on hand, but, while timorous outfits were worrying about what was to become of the dealer field, Fitzpatrick was rapidly adding to his used-car inventory. By April 1 this year, although he had sold 25 used cars a month during the fall and winter, he had built

up his inventory to 165 to meet the upsurge in used-car demand which came along in the spring.

But a large inventory was not the complete answer to successful used-car selling, even in the fast-moving market that developed. Buyers wanted cars but, even though there was a war on, they were not prepared to buy a vehicle simply because it had four wheels on it and an engine that turned over. They wanted the car they wanted and none other. That meant a dealer had to have not only a large number of cars but also a wide variety of makes and models. And, with war workers' pockets bulging with cash, it often meant that a used car had to be a late model and in the pink of condition.

Fitzpatrick has been able to meet every challenge, and his used-car volume today is enviable.

In the first place, Fitzpatrick knows how to buy used cars. Anybody can buy them, as the experience of mushrooming speculators in the East have shown, but it is a different thing when a man is a dealer and not only has to resell

the cars to consumers but also has to figure on continuing in the retail automobile business after the war. Fitzpatrick came by his knowledge of used-car buying through dealing in used cars exclusively for years before he took the Pontiac franchise in 1935. Last winter he bought the kind of cars he knew would sell.

Storage was a problem in itself. Fitzpatrick showed his faith in the future by purchasing a larger modern building several blocks from

Repainting, a step on which the Fitzpatrick shop lays great emphasis. The painter is 66.



water
aring
on TO
above
Leban
t. 1934
1935

TRAILERS
Used trailers. 1 21-ft.
also trailer. Also used trailers
Green Trailer Park, RD
Pa. Chester 7953.

Automobiles Wanted

HIGHEST PRICES
ALL CARS AND TRUCKS
'31s TO '41s
ANY MAKE OR MODEL.
enables us to pay more.
our price before you sell.
MCCOY MOTORS
LEHIGH AVE. NEB. 9664.

WANTED AT ONCE
LATE MODEL CARS
'35-'36-'37-'38-'39-'40-'41
BEFORE PRICE CEILING
Your Car in Where Price is N
For Clean Cars—Cash at
DIRECT DODGE DEALER
4733 CHESTNUT S

SELL YOUR

has
etail
war.
edge
ling
ears
chise
the
self.
the
mod-
From

his old location, and here he estab-
lished a used-car sales room and
service shop. He continued to op-
erate the open-air lot at his old
location. Late-model cars were care-
fully reconditioned and stored in
the new building, while older cars
were stored on the lot.

Reconditioning used cars under
present conditions may seem unnec-
essary but Fitzpatrick has found
that it pays in several ways. It en-

(Continued on page 92)

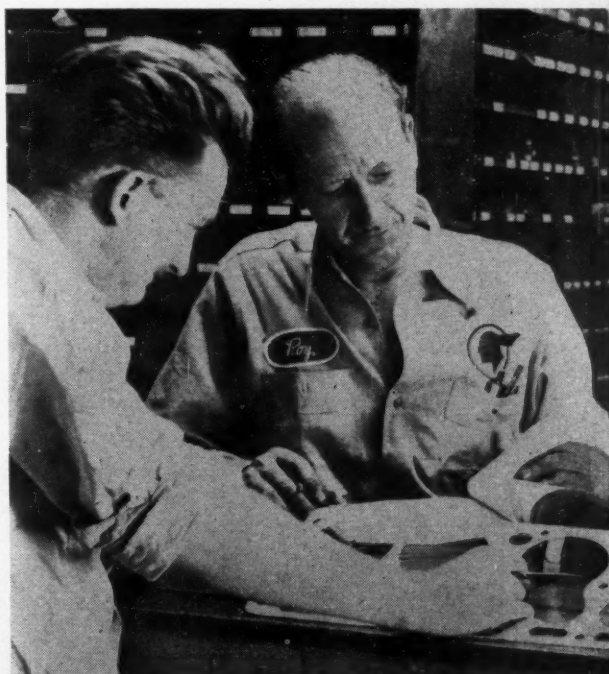


Ralph Smith, service manager, checks a car before it enters shop for reconditioning. No point is missed.

Checking with the parts department to see that parts are on hand before reconditioning is actually begun.



Discussing a problem of vital importance par-
ticularly to dealers, this article is only one of
many in this issue of **MOTOR AGE** that make
profitable reading for the car dealer and the
men in his shop. All the articles in this and
every other issue of **MOTOR AGE** offer helpful
information on management, service, official
regulations, and current developments pertain-
ing to the automotive retail field.



RATIONED SERVICE

This shop finds an easy way to prevent work from overwhelming it yet keep owners happy and essential cars and trucks in operation

By ROSE LU DeWINDT

DESPITE the severity of restrictions on automobile driving in the Northeastern states, a good many repair shops have more work to do than they can handle. Most shops find the situation extremely perplexing.

Such customers as can still drive any considerable mileage demand just as much service as in peacetime and, when repairs are necessary, they are often heavier than usual. Further, owners are impatient at delay. Few shops under present-day conditions of skeleton labor forces can satisfy every customer on every count, and that poses a problem to which many shops are still seeking a solution.

Lakehurst Motors, at Toms River, N. J., has found an answer. It is not the perfect answer, perhaps, but it works. It is service ration-

ing to all classes of customers.

The situation at Toms River, on the mainland side of Barnegat Bay on the northern New Jersey Coast, differs somewhat from that confronting the usual shop. Normally, business is seasonal, booming when the summer residents arrive and falling off when they return home.

The war changed things greatly. Pleasure-driving bans and gas allotments of "A" book holders to a few drops weekly kept all but a handful of vacationers at home and prevented even local residents from doing any but the most essential driving. However, these very restrictions placed a greater load on Lakehurst Motors, as several shops in the vicinity went out of business, either through inability to get help or through the drafting of the proprietors themselves.

Further increasing the load was the nearness of Lakehurst Motors to the great airship base of the Navy at Lakehurst, only a few miles back in the pine barrens. A great many of the Navy personnel at the base brought their cars with them, and these had to be serviced regularly and repaired on occasion.

This same airship base took many of the area's best automobile mechanics, and, of those left, many were drafted. The Lakehurst Motors shop alone lost 13 men to the airship base and 17 to the armed services.

Oscar Downs and his son, William, who operate the dealership, worked practically 24 hours a day but their best efforts were only a drop in the ocean of work that flooded in upon them. Then they did some thinking and reached the perfectly sound conclusion that a shop so undermanned as theirs could not possibly handle the work and that limits had to be placed on the quantity of work it could accept. The result was strict rationing of service.

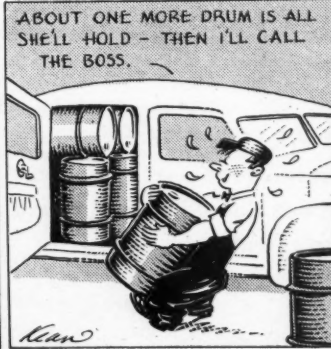
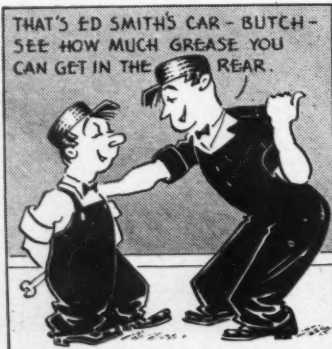
First of all, it was decided to refuse two out of every five service jobs that came into the shop. Naturally, this could not be done by arbitrarily turning down jobs every fourth and fifth job. Consideration had to be given to the essential or non-essential nature of the vehicle and the needs of the owner.

It was obvious that truck service could not be reduced. The area is almost entirely dependent on motor transportation, and trucks simply had to be kept running.

Next there were old customers. These had to be thought of not only as owners that had been loyal to the firm in the past but also as potential post-war customers. Even

(Continued on page 78)

BUTCH . .



as
rs
he
ew
A
nel
th
ed
on.
ny
ne-
ny
Mo-
che
ned

THE newest automobile on American highways today is at least a year and a half old.

This is a fact of importance not only to automobile owners but also to the operators of lubrication lifts. It means that American automobiles are old and getting older, and no new ones are in sight. As yet, despite the collapse of Italy, there is no hint as to when the war will end, and no agreement as to how soon after peace the production of new cars will be resumed. Cars now aging on the road can be kept in operation only by reducing wear to the minimum, and that can be accomplished only by proper lubrication.

In one respect, wartime lubrication is little different from that of the easy-going days before the war. That is the necessity of changing over to winter-grade lubricants in the fall. The only difference is that the penalty for not changing may be more severe. Lighter engine oil is essential in winter to save wear on moving parts in starting and unnecessary drain on the battery. Winter-grade lubricants in both transmission and differential are absolutely necessary under present-day conditions to avoid the possibility of damage to gears and bearings.

Except for seasonal change-over, wartime restrictions on the use of automobiles has forced both owners and servicemen to revise their thinking about lubrication, for war has brought changes in operating conditions. Automotive oils and greases were designed to meet the exacting requirements of pre-war driving, which was done at relatively high speed and more or less continuously. They met these requirements superbly. Then came tire and gasoline rationing and reduced speed limits and the use of millions of cars was drastically cut.

One of the improvements introduced to provide better engine lubrication was the addition of certain compounds, to the oil, either at the refinery or at the filling station. These were intended to improve the lubricating qualities of the oil and keep the whole lubrication system free of impurities and thus prevent, or at least retard, the formation of varnish and sludge.

However, the use of such additives put an end to one rule-of-thumb for changing engine oil. Color could no longer be used as a



War Brings New LUBE Needs

**Prevention of damage and needless wear demands
that latest factory recommendations be heeded**

gage to determine when oil should be changed. Some additives tend to hold fine carbon in suspension, giving the oil a dark color, while its lubricating characteristics remain unimpaired. Under the circumstances, it is necessary to ignore color entirely and follow factory instructions carefully.

Oils that contain no detergents may still be changed on a mileage basis, but the interval between changes is shorter than it was before the war. The reason is that reduced driving has brought lower crankcase temperatures. Diluents, which inevitably slip past the piston rings to mix with the crankcase oil, are not evaporated as they used to be under peacetime operating conditions. It is these diluents that help to form varnish and sludge,

which clog oil screens and raise the devil generally with bearings and rings. The color of oil to which no detergent has been added is still a useful guide to the need for changing oil but here also it is best to follow factory recommendations.

Some factories have sharply revised their recommendations since war began, and oil companies have been studying the problem closely. The smart serviceman will consult these sources of up-to-the-minute information. It is important that customers be kept aware of the importance of regular and adequate lubrication. A slip in peacetime sometimes meant a costly repair; now it may mean scouring the community for a part and perhaps a long lay-up in a busy shop.

(Continued on page 94)

DID YOU Know It?

WHO?

WHAT?

WHEN?

WHERE?

WHY? . . .

"E" Is the Cat's



Everyone is always eager to beat a record. Owners of fast horses hope to break Man O' War's 1 $\frac{3}{8}$ mile record of 2:14.5, the race driver tunes his car, hoping to exceed Mauri Rose's speed of 115.117 m.p.h. for the Indianapolis 500, and the baseball player hopes to better Sisler's batting average of .409. Sometimes they com-

pete for gold, sometimes for a silver cup, and often just for glory.

Manufacturers producing for the war have received the Army and Navy "E" award after attaining certain records of production, and an award of merit is provided for individuals who have contributed in an unusual degree to our war-production activities. The latest to receive such an award, according to Chuck Tapscott, is Lady Wimpy, employed as a mouser in the Ordnance Division of the McQuay Norris Mfg. Co. This award was bestowed as the result of her production of four kittens.

While we appreciate that WPB, as emphasized in the letter that accompanied the award, was doing so facetiously and did not wish to set any precedent, still we are led to wonder what the reward would have been if the cat had produced only two kittens or had gone to the other extreme and produced six. Also, was the cat operating as an amateur or as a profes-

sional?—(The reference is to the production of kittens, not Lady Wimpy's rat-catching proclivities.)

These points should be cleared up, for undoubtedly there are many other Lady Wimpies who deserve recognition and are only waiting for a clarification of the rules before going to work. And why should Lady Wimpy be singled out for the award? After all Sir Wimpy (or was it just a friend of the family) deserves some recognition. As it is, the Amalgamated Order of Tom Cats will probably set up a howl that there has been rank discrimination and demand equal or better awards.—*Bill Toboldt.*

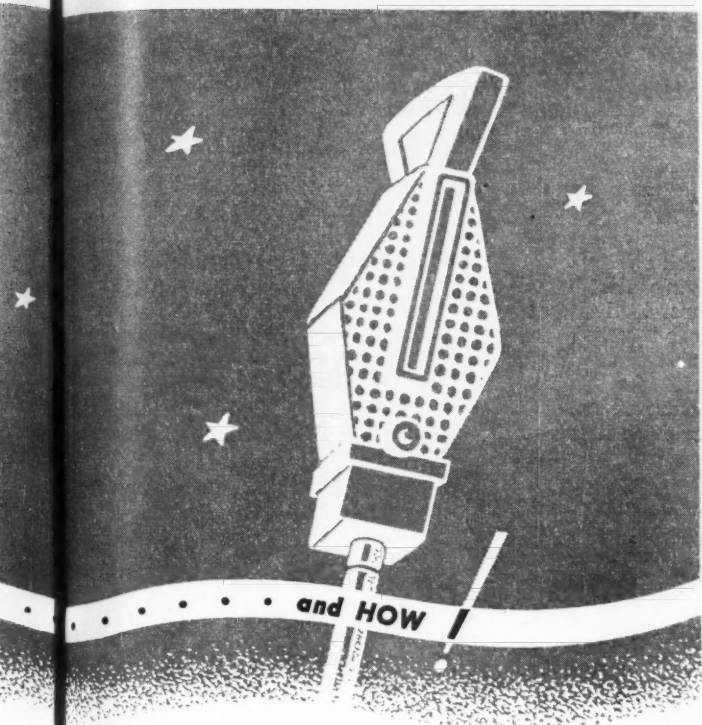
Dodos



Besides expressing his individuality in engineering construction and design, the builder of an automobile in the early days let his imagination run riot in picking a name for his creation. It is evident that he gave little thought to the buyer's pride of ownership. You would find it difficult, for instance, to picture the

gleam in the eye and the smug smile of the man who could boast of owning and driving one of the following makes, culled from a list of more than 1,500:

Acorn, American Chocolate, Autobug, Auto-Go,



Backhus, Bee, Bird, Black Crow, Bliss, Blood, Boss, Browniekar, Buggy, Bugmobile, Celt, Cricket, Crock, Crouch, Dan Patch, Darling, Dodo, Drednot, Electrobat, Emancipator, Friend, Harrigan, Hazard, Hockenhull, Imp, Lad's Car, Magic, Mighty Michigan, Old Reliable, Onlicar, Ottomobile, O-We-Go, Owen-Shoeneck, Poppy Car, Pratt, Railsbach, Rasser, Red Bug, Ricketts, Roach, Serpentina, Spiller, Sprite, Success, and Zip.—*John Cleary.*

Second Time 'Round



War production is no novelty for the presidents of American automobile companies. Most of them cut their manufacturing eye teeth on the gears and pinions that went into the tanks, trucks and other armaments of World War I. Charles E. Wilson, president of General Motors, was then in the design and development

section of the Westinghouse Electric & Mfg. Co. at Pittsburgh, concentrating on the development of dynamotors and radio generators for the Army and Navy. K. T. Keller, president of Chrysler, was general master mechanic of the Buick Motor Division, which was producing Liberty aircraft engines and shells.

George T. Christopher, chief executive at Packard,

was shop superintendent of the Standard Mfg. Co., a maker of automobile wheels, at Terre Haute, Ind., when World War I broke out. He became a first lieutenant in the Ordnance Dept. A Detroit manufacturer who was an ordnance major, remembered Christopher from his automobile experience and had him transferred to the Dodge plant at Detroit. Christopher served there for 18 months as ordnance representative in the factory where Dodge made 155-mm. guns.

Henry Ford, then as now, supervised armament production at the vast Rouge plant, which in 1917 was just under construction. During the war, Ford built 43 eagle boats, 3,950 Liberty aircraft engines, 8,000 trucks, 6,126 ambulances, 10,000 gun caissons, all the cylinder forgings for plants making Liberty engines and 2,731,000 helmets.

George W. Mason, president of Nash-Kelvinator, was the young production chief of the government's Rock Island (Ill.) Arsenal, making everything from knives and forks for the troops to 20-ton tanks and artillery. Paul G. Hoffman, Studebaker's president, was branch manager for Studebaker at Los Angeles when World War I began. He enlisted as a private, but became a first lieutenant. Transferred to motor transport, he had charge of a motor-vehicle pool when the war ended.—*Ed Warner.*

Dealer No. 1



In one of his "Believe It or Not" cartoons not long ago, Bob Ripley asserted that more than 900 different makes of automobiles were operating on American roads in the early '20s. That statement was calculated to make readers raise an eyebrow, but one person who would not question it is John Van Benschoten, of

Poughkeepsie, N. Y., who has been an automobile dealer longer than anyone else in the country.

Van Benschoten sold his first automobile as a dealer in 1900 and in the ensuing 41 years he has handled no less than 29 different makes. Only seven of the factories whose products he sold are still counted among automobile manufacturers.

The cars he has handled are Mobile Steamer, Oldsmobile, Stevens Duryea, Ford, Chalmers, Autocar, Knox, Waverly Electric, Winton, Pope Toledo, Mitchell, Packard, Buick, Hupmobile, Chandler, Lozier, Thomas, Locomobile, Simplex, Peerless, Marmon, Kissel, Stutz, Maxwell, Studebaker, Hudson, Nash, and Stevens. He has held the Dodge franchise since 1914.

Over the door of Van Benschoten's salesroom is suspended a high-wheeled bicycle, the first cycle sold by him in 1891.

Van Benschoten's present intention is to resume the sale of Dodge cars as soon as the factory starts producing them again. His two sons—one a Navy Lieutenant, the other an Army captain—will take over active management of the firm when they are mustered out of service.—*J. E. Ford.*

Ceiling Prices Set For Synthetic Tires

PPRICE ceilings paralleling maximum prices for natural-rubber tires and tubes have been established by the OPA for synthetic-rubber tires and tubes. The synthetic prices are contained in Amendment 14 to Revised Price Schedule 63, effective Sept. 9.

The maximum prices for four-ply passenger-car tires of synthetic rubber are:

4.50-12	\$9.10	6.50-16	17.90
4.00-15	7.80	7.00-16	20.30
5.00-15	10.80	7.50-16	25.75
6.50-15	17.50	5.25/5.50-17	13.55
7.00-15	19.80	6.00-17	16.00
8.25-15	28.15	5.25/5.50-18	12.35
5.00-16	10.70	6.00-18	17.25
5.50-16	13.15	4.75/5.00-19	11.05
6.00-16	14.75	5.25-20	15.10
6.25-16	16.60		

The truck-tire ceilings are:

8.25-15	\$68.50	8.25-20	67.65
7.50-18 (32x7)	62.10	9.00-20	80.75
8.25-18	65.75	8.25-22	72.40
9.00-18	78.10	9.00-22	84.75
10.50x		7.00-24 (36x6)	55.10
11.00-18	106.00	7.50-24 (38x7)	71.10
7.00-20 (32x6)	47.50	8.25-24	76.40
7.50-20 (34x7)	63.40	9.00-24	88.15

Maximum prices for passenger-car tubes range from \$2.40 for the 4.00-15 size to \$6.60 for the 8.25-15. The 6.00-16 size has a maximum of \$3.65, but certain brands maximums ranging down to \$1.95.

The range of truck-tube prices is naturally wider and the number of sizes covered is much more extensive than the list of truck-tire sizes. The maximum for the 8.25-20 size is \$10.25, although certain brands are priced lower, dropping to \$7.80 for

some brands. The maximum for the 11.00-20 is \$14.95.

Maximum retail prices for factory seconds of manufacturers' brands of tires and tubes are set at 25 per cent less than the maximums for first line products. Other second-line synthetic tires have a maximum 20 percent less.

Maximum prices for private-brand tires and tubes are somewhat lower than for tires carrying the brand name of manufacturers. For example, the private-brand ceiling for a 6.00-16 passenger-car tire is \$13.25, compared with \$14.75 for a tire carrying the manufacturers' brand.

Where no maximum price has been established for natural-rubber tires of the same size, the ceiling for synthetic tires is to be calculated by multiplying the maximum for the four-ply 6.00-16 size by certain percentages. These percentages are:

6.00-16	6-ply	125 per cent
6.50-16	6-ply	152 per cent
7.00-16	6-ply	172 per cent
7.50-16	6-ply	218 per cent
5/25/5.50-17	6-ply	115 per cent
5.25/5.50-19	4-ply	106 per cent
4.50/4.75/5.00-20	4-ply	83 per cent
4.40/4.50-21	4-ply	75 per cent
30 x 3½	4-ply	64 per cent

Changes in the ceilings for synthetic tires and tubes are in prospect, since the OPA, in announcing the price maximums, said that the industry had recommended higher prices but that production experience had been too slight to make possible an accurate calculation of production costs and that the maximums would be reconsidered when what the OPA

terms "reliable" cost data is submitted.

Used Truck Maximums To Be Lowered Jan. 1

BEGINNING, Jan. 1, 1944, maximum prices for used trucks will drop 4 to 7 per cent, according to the price lists just announced by the OPA for 1944. When sold as is, 1943 and 1942 trucks sold new this year will have a maximum price during 1944 of 85 per cent of the "when new" price. Warranted vehicles will have a maximum of 97 per cent. Current maximums are 92 per cent for as is trucks and 103 per cent for warranted vehicles. The table of percentages for use in 1944 follow:

Model Year	Percentages	
	As Is	Warranted
1944	92	103
1943, 1942 (sold in 1943)	85	97
1942	73	86
1941	63	78
1940	58	73
1939	55	70
1938	51	67
1937	46	62
1936	41	58
1935	37	54
1934*	33	50

* 1933 and lower model year vehicles take the percentages applicable to 1934.

Anti-Freeze Ban Lifted

THE ban on the sale of permanent-type anti-freeze for use in passenger cars, eased for high-altitude states in August, has now been lifted entirely, the WPB has announced.

★ WASHINGTON WHISPERS ★



TOOLS

Civilians who have been having a tough time getting hand tools because the Army had first call on them can take some comfort from the fact that the Army is checking its inventory of tools, presumably with the idea of determining if its heavy purchases must continue. It is suspected that the Army already owns stocks of tools that it is unable to identify. The loss of identity comes about like this:

Tools are ordered and shipped into Army warehouses under manufacturer's part numbers. The using departments of the Army order tools from the warehouses by Ordnance part number. Unskilled stock clerks may or

may not be able to match these numbers up, with the result that unexhausted supply may be replenished several times. Civilian experts are being called in to help solve the problem.

GASOLINE

The way we hear it, the review of the B and C gasoline allotments in the East, which is supposed to result in a one quarter saving of the gasoline consumed by this class of users, does not mean that the basic A ration will be increased to equalize it with the A ration in other parts of the country. Despite increased deliveries of crude oil via pipe line and rail, the winter season is approaching, with consequent increased requirements for fuel oil, and

Release of permanent-type anti-freeze for all vehicles is effective Oct. 1. The anti-freeze covered is defined as solutions made from or containing ethylene glycol. The order will have no effect on supplies.

New Retread Equipment Is Banned by WPB

EFFECTIVE Oct. 1, manufacturers of tire retreading, recapping and repair equipment are forbidden to manufacture any such equipment except to fill, under special authorization, orders already on hand and to make maintenance and repair parts. Items having a retail value of \$85 or less are excepted from the order.

The amendment to Order L-61, dated Sept. 18, forbids manufacturers to fabricate component parts for, or assemble them in the manufacture of any new full circle and sectional molds, matrices, curing tables, curing rings, steam chambers or kettle curing devices, except for the uses mentioned.

Repairman seeking new retreading, recapping, or repair equipment or parts must apply on Form PD-840 for an authorization in writing by the WPB.

Battery Limit Upped

HIGH-PRODUCTION manufacturers of replacement batteries are authorized by an amendment to Limitation Order L-180 to increase their output of batteries to 5 per cent more than their 1941 sales.

(Continued on page 114)

WASHINGTON RULINGS AND REGULATIONS



this increase will amount to more than the saving. Many well-informed observers feel pessimistic about gasoline allowance increases. They have the feeling that it is a case of keeping warm at home or going somewhere in an automobile, but not both.

TRUCKS

It has been reported in this column that the people who have any great faith in a new truck building program for this year or next are few. It is hereby reported that they are now fewer, influenced no doubt by the Army requirements for next year, which in itself will make a pretty healthy truck production year, everything considered.

PARTS

The Office of Economic Warfare has been working on some maintenance procedures designed to conserve replacement parts being used on American civilian vehicles abroad. The effort seems to be directed toward a basis

of enough maintenance to keep the vehicles operating but not at the standard that a fussy owner would like. It is hard to say, if the plan goes through, whether the procedures would be suggestions or rules. However, it should not make much difference if the OEOW controls the stockpile.

PROBLEM IN REVERSE

While most of us have been devoting some thought to measures to compensate for the lack of lead in gasoline causing a lower octane value, some services of the Army have been thinking about how to get rid of the lead. The Army gasoline is a high-octane number, using a liberal portion of lead, and the Army has some engines that operate much better without any lead at all. For some reason, the Army cannot buy unleaded gasoline, with the result that there is now a problem of how to remove the lead from the gasoline. Perhaps buying unleaded gasoline would be too simple a solution. At any rate the removal of lead is a serious project in the Army.

NEW PROFIT MAKERS

PARTS TOOLS EQUIPMENT ACCESSORIES

Wrench for Tight Spots

Here is a unique wrench which replaces the so-called right-angle wrenches and can be used for brakes and also many other purposes where a wrench must operate in a very limited space. The wrench will easily remove nuts which would be impossible with any other wrench because



they actually function in spaces where only an inch or two of movement is permitted. Has 15 degrees and 60 degrees angle heads. Permits 24 different "bites" on a nut in a 360 degree Circle. Rating of A-9 or higher is required for the purchase of this tool. Manufactured by The New Britain Machine Co., New Britain, Conn.

All-Position Electrode

Coincident with the recent announcement of a new line of P&H A.C. industrial arc welders, the Harnischfeger Corp. has introduced a new all-position electrode designed especially for use with A.C. transformer welding machines. Suited for all mild-steel applications, it is being made in the usual sizes of $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{1}{4}$, and $\frac{5}{16}$ in., and 14 and 18 in. lengths, packed in standard 50-lb.

containers. Detailed information and welding procedures are available on request from the manufacturer, Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wisconsin.

Soldering Fluid

Out of the war comes the problem of soldering with low-tin-content solders. Hence a new flux known as Lloyd's No. 6 Soldering Fluid, manufactured by Lloyd S. Johnson Co., 2241 Indiana Ave., Chicago, Ill. Here is a flux that breaks down lead-rich solders into an absolute fluid that will flow into inaccessible places. A flux that has high enough capillary action to make solder flow evenly and completely through solder joints and provide even higher tensile strength than heretofore obtained with 50-50 solders. Users report that now they can get finest results from $2\frac{1}{2}$ to 6 per cent silver-lead solders, as well as any of the low-temperature solders. It is said to be ideal for soldering zinc-coated sheet metal (both galvanized and electro-plated), lead-coated sheet metal, tin plate,terne plate, brass, copper, steel and all types of sweat fittings. Also makes lead-burning jobs easy. Material does not crawl or creep, has no irritating or choking fumes. It is so highly concentrated that you can dilute it with one to two parts of water for materials that are easy to solder. To speed the war effort, a few samples of Lloyd's No. 6 Solder-

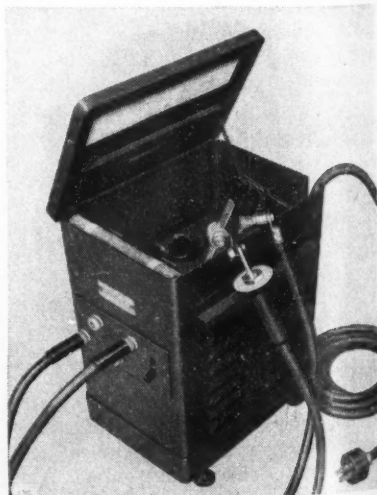
ing Fluid is being mailed to any company making direct request.

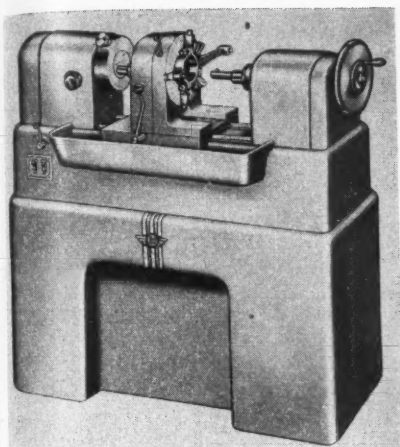
Metco "Fuse-Bond" Process

Metallizing Engineering Co., Inc., announces the revolutionary new Fuse-Bond Process, and equipment for its application, whereby machine components and similar metal parts now may be prepared for metallizing electrically. Main advantage of the process is that it affords an adequate bond on the hardest surfaces, heretofore impossible or impractical to prepare by blasting or rough threading. It also simplifies preparation of narrow edges, flat areas, and cylindrical parts having keyways, and other interruptions in their surfaces.

Application of the process is with the Metco Fuse-Bond Unit. Operating on any 110 or 220 volt, single-phase power line, this equipment fuses a rough deposit of electrode metal into the surface to be metallized. Electrodes are applied to the work with a special holder which uses up to six electrodes at a time, depending on the size and nature of the part to be prepared. Small parts may be prepared with this equipment as easily as large shafts, since there is no excessive heating of the base metal, or disturbing of its physical characteristics.

The Fuse-Bond Unit is extremely compact, being contained in a cabinet measuring only 24 in. high. Weight complete is but 170 lb. All cables and attachments fit into a bin in the top of the cabinet. Mounted on casters, it can be wheeled right to the job with ease. A complete Instruction Manual provides all operating data. Unskilled labor can operate efficiently within an hour or so. Further information on the process and its equipment contained in Bulletin 44, obtainable from Metallizing Engineering Co., Inc., Long Island City, N. Y.





Con-Rod Reconditioner

A new machine for precision reconditioning of car, truck, and tractor con-rod forgings, up to 5 in. in diameter, is announced by Charles R. Crowder, manager of the Automotive Division of the Van Norman Machine Tool Co., Springfield, Mass. This machine, designated as the No. 222, will also bore semi-finished babbitt rods to size, and will likewise quickly bore accurate wrist-pin holes in exact alignment with the rod.

The machine incorporates many new design features, which make possible faster and more accurate reconditioning of this type. Among these features are rapid-action centering and clamping, eccentric grinding with an entirely new type of size-control mechanism, by which the grinder is set while the machine is running; modern type of coolant system; and anti-friction bearings throughout. Full details may be obtained from the manufacturers.

Extinguisher Case

To reveal instantly any attempt to tamper with fire extinguishers, American-LaFrance-Foamite Corp. Elmira, N. Y., has introduced a new inexpensive extinguisher case, known as the Tampless Case.

Constructed of non-critical, tough cardboard stock, it safely houses the extinguisher from the reach of unauthorized persons, and yet allows of instant removal for legitimate use. One quick pull on a sealed string breaks through a gummed-paper sealing strip and permits the Tampless Case to unfold. The extinguisher can immediately be lifted from its bracket.

The Tampless Case can be reused. A unique feature of the Tampless Case makes available for the first time important fire-fighting instructions at the actual location of each extinguisher. Precise information on

the front of each Tampless Case shows the classes of fire on which extinguishers should and should not be used.

Rust Inhibitor

A new chemical inhibitor for reconditioning last winter's anti-freeze solution is now available to car owners, the duPont Co. announces. The new compound, developed by duPont last year for the U. S. Army, is being released for civilian use in cooperation with a WPB request that motorists conserve their old anti-freeze solutions.

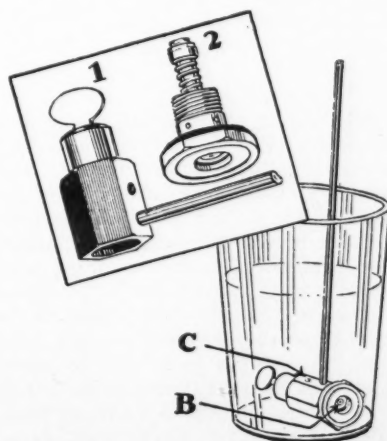
Automotive engineers have learned that some types of anti-freeze lose their rust inhibiting properties and become acid after extended use. If they are re-introduced into a cooling system without being treated with an inhibitor, they will promote rust and corrosion. The acid may attack the metal parts.

The new duPont product does not contribute to the anti-freeze properties of a solution but simply neutralizes any acid formation and restores the lost rust inhibitor. When treating the anti-freeze, it is advisable also to filter it.

Economizer-Valve Tester

This ingenious little device, recently put on the market by the Hygrade Co., makes it possible for the first time to determine whether the economizer valve on the Ford (Chandler-Grove) carburetor is functioning properly.

The testing operation is extremely simple. The economizer valve is removed from the carburetor body, gasket and all, and screwed into the valve tester exactly as you would install it in the carburetor. You then place the hex end of the tester in a glass of water or gasoline, submerged at least 2 in. below the surface, and blow through the tube at a

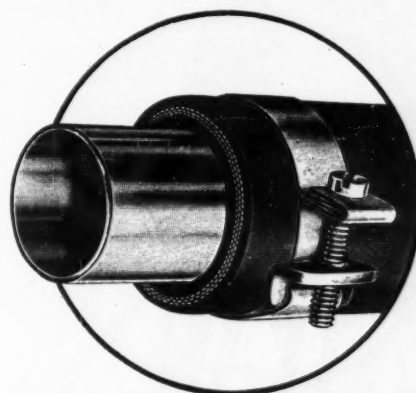


moderate pressure. If bubbles come out of the hole at C, it indicates that the seat is leaking; if they appear at B, the diaphragm is leaking. In either case, the valve is defective and should be replaced.

For full particulars on this item, known as CT-50 Economizer Valve Tester, write the makers, Hygrade Products Co., Inc., 35-35 Thirty-fifth St., Long Island City, N. Y.

Hose Clamp

Popular for many years in the automotive industry, All-Size Universal Hose Clamps are now serving many unusual and vital needs in wartime production and replacements.



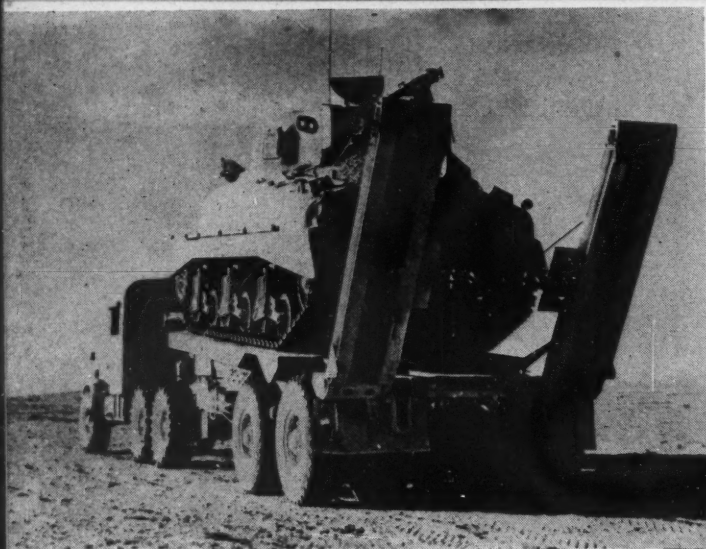
A primary reason for this greatly broadened use of All-Size Clamps, says the manufacturer, is the fact that a single length All-Size replaces more than a hundred different sizes of preformed clamps, reducing clamp inventory and guaranteeing that the right size clamp will be ready at hand the instant it's needed. For this same reason, many large commercial fleet owners and automotive equipment manufacturers have come to rely upon the universal character of All-Size Clamps.

All-Size Universal Hose Clamps are manufactured by the Central Equipment Co., 1018, S. Wabash Ave., Chicago, Ill. A free sample will be sent on request.

Armature Turning Kit

The Burton-Rogers Co., 857 Boylston St., Boston, Mass., has recently placed on the market a new kit for holding centerless armature shafts while truing up the commutator.

This new Dead Center Armature Turning Kit consists of two cup-type holders which automatically center all shafts up to 1 in. in diameter; two No. 2 and two No. 1 Morse Taper Arbors, and a special malleable-iron lathe dog. These are packed in a substantial wood case.



TANK CARRIER. Ready to plunge into the fighting an M-4 tank is delivered to U. S. front lines. The carrier is equipped with runways to permit speedy unloading of tanks.



William Jeffers

THE passing of Rubber Director William Jeffers from the Washington scene is occasion for sincere regret.

Jeffers was purpose in a sea of confusion, a worker in a hive that sheltered many drones, an executive mostly surrounded by bureaucrats. He tackled one of the toughest assignments ever to confront a single man. He battled valiantly against all opposition, subdued it, and then quietly and with dignity laid down the cudgels.

Now that the synthetic-rubber program is moving ahead rapidly and the spectre of a rubber famine no longer haunts the land, it is not easy to appreciate the tremendous job done by Jeffers. The rubber situation was chaos when the Baruch Com-

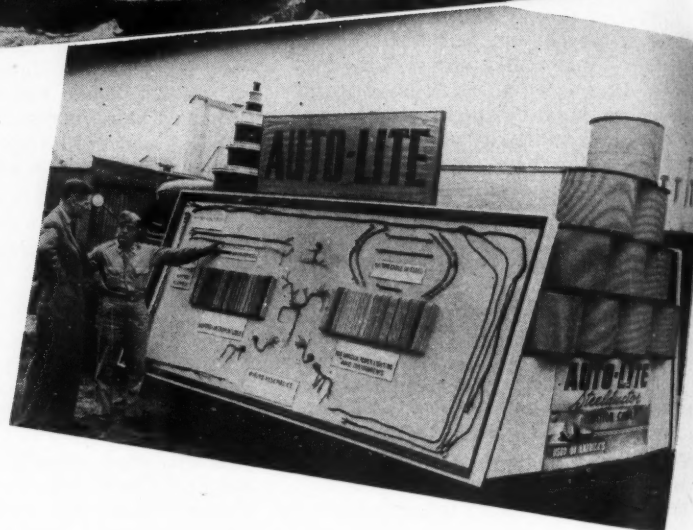
mittee began its magnificent study last year. The committee measured the immensity of the problem and drew up recommendations for its solution, but it had no power to proceed further. The proper authority was created by executive order and Jeffers was drafted from his position as president of the Union Pacific to carry through the recommended program. His choice gave rise to some misgivings in the automotive field, for it was believed that a railroad man could never see eye-to-eye with auto-

motive men on the question of highway transport. It was forgotten at the moment that Jeffers was above all an executive.

During his term as rubber director, Jeffers fought the cotton planters so that rayon could be used in heavy-duty tires; he fought the military when it tried to grab the materials needed to complete the synthetic-plant program; and he fought everyone and everything that stood between him and the achievement of his goal.

Late in August, Jeffers announced

MUTUEL ACQUAINTANCES. Better known as race fans, the owners of these cars crowded Aqueduct race track the day after the pleasure-driving ban was lifted in East.



ARMY CARAVAN. This exhibit of automotive and aircraft wire and cable was one of the most striking that greeted an Army Caravan on its recent visit to Port Huron, Mich. Caravan paraded, then staged a sham battle.

DEALER PILOT. Former manager of an automobile dealership at Grapeland, Tex., Miss Ruth Ellen Daley, shown at controls of her plane, is now a qualified ferry pilot.



SCOUT IN ARMOR. This British Morris Mark I light reconnaissance car, equipped with Bren and anti-tank guns, proved its worth in African fighting. It fights tanks, or strafes ground troops.



RAISING CEILING. The two-speed two-stage supercharger which this Packard workman is adjusting will, it is claimed, raise ceiling of air warfare by nearly two miles.

advised to consult his local U. S. Employment Service office to learn how important his work is considered in relation to the war effort.

Recently, Kansas City dealers asked the USES in that city for a ruling on men in automotive establishments. Although USES offices in other cities may have different ideas, it is interesting to note that the following automotive jobs are considered essential in Kansas City:

All automotive trades (including administration but not salesmen).

Service managers.

Parts managers.

Electricians.

Maintenance mechanics.

Automotive mechanics.

Motor-cycle mechanics.

Radio repairmen.

All-round welders.

Sheet-metal workers.

Lubrication men.

Mechanic's helpers, if employed full time.

Service Demands High

That the need for service on America's gas-rated vehicles continues at high levels is amply demonstrated by the experience of The Electric Auto-Lite Co., according to a statement by Royce G. Martin, president of the company. Martin's statement in part follows:

"The demand from our distributors, service stations and dealers for automotive replacement parts continues at peak levels for the war. Civilian requirements for spark plugs, batteries, cable, distributors, generators, coils, starters, voltage regulators and other units feeling the stress of con-

that 30,000,000 tires would be made in American factories during 1944, and that even in the remaining months of this year enough synthetic-rubber tires would be made to meet the demands of C and B gas-book holders. That was not quite a year after the Baruch Committee had released its report showing the desperate situation in our rubber supply.

That is the way to evaluate the achievement of William M. Jeffers, an executive that left press agency and recriminations to the bureau-

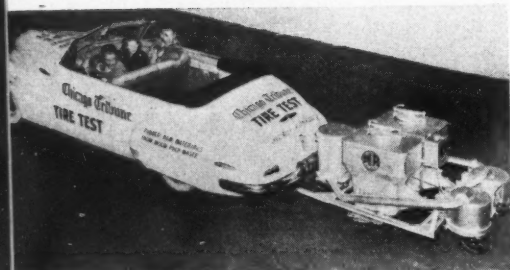
crats, and did his job. We could do with a man like him on the gasoline situation.

Essential Men

EVEN with a list of essential occupations and another list of non-essential occupations, there are still many unclassified jobs so far as War Manpower and Selective Service decisions are concerned. A man holding one of these borderline jobs usually is

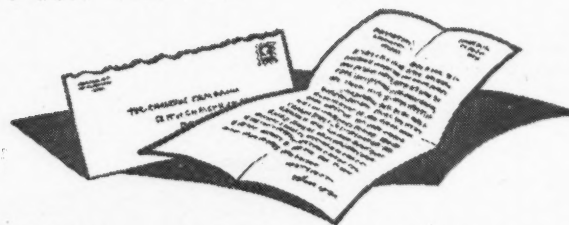


COTTON RETREAD. Woven of cotton and rubber by a carpet mill, it is used as tread material for tires. It is cemented to tire casing and the tread overlaid with rubber.



SYNTHETIC CAR. The synthetic tires are made from alcohol obtained from paper waste. Power is supplied by charcoal gas from the generator carried on the trailer.

RUBBER BOSS. Col. Bradley Dewey, who steps up from assistant's role to succeed William M. Jeffers as Rubber Director. Dewey is head of a Boston chemical firm.



DETROIT LETTER

By ED WARNER

A RECENT survey of Michigan's automotive resources undertaken by the Michigan State Safety Commission at the request of Gov. Harry F. Kelly reveals some rather surprising figures as to the age and mileage of war workers' cars and the important part that repair shops must play in keeping these cars in operating condition. As of July 1, 1943, 47.6 per cent of the automobiles carrying workers to Michigan war plants were at least six years old and 52.9 per cent had been driven more than 40,000 miles. Rationed new passenger car stocks in the state totaled only 6052 cars on July 1, which is a small number when compared with the 170,740 passenger cars which are expected to go off the Michigan highways in 1943.

The report, prepared by Maxwell Halsey, executive secretary of the State Safety Commission, points out the vital part that preventive maintenance must play in keeping civilian cars on the road. It states:

"It becomes increasingly important that the eventual and most serious transportation bottleneck will be repairs. Dented fenders and such are of small concern. Neither the manpower nor materials can now be afforded for repairs of this nature or repairs which do not relate directly to the performance of the vehicle. Smashed radiator grilles are unsightly but they do not interfere with performance. Every car owner should give his car frequent check-ups. Unessential repairs should be postponed until after the war. But repairs which are necessary for the safe and efficient operation of the vehicle and those which prolong its mechanical life should be made as promptly as possible.

"Timely repair to an ailing gear or bearing will prevent a serious breakdown later. If a minor mechanical repair, which would take only a few minutes of a mechanic's time, is neglected, it will take up much more of his time later and will be much more costly. Or the resulting breakdown would cause the vehicle to be lost for the duration because replacement parts may not be obtainable. Preventive maintenance includes regular and correct lubrication, battery

(Continued on Page 76)



tinued vehicle operation provide ample evidence that the American motorist is taking care of his car and is determined to keep it on the road as long as possible. Car dealers, independent repair shops and garages report a volume of

service business, in many instances, beyond their capacity to handle.

"Our company is doing everything possible to distribute parts in a fair manner among our thousands of service outlets. Our first production obligation is, of course, to the armed forces, but it is gratifying to report that by and large we have been able

to keep the trade reasonably well-supplied on most units."

Auto-Lite is currently producing a wide variety of war equipment in 22 plants employing approximately 25,000 works.

Synthetic Limits

ALTHOUGH the production of synthetic-rubber tires next year should be adequate to meet essential needs, E. J. Thomas, president of Goodyear Tire and Rubber Co., told the SAE at Detroit last month that users cannot expect the performance of 100 per cent synthetic tires to equal that of natural rubber.

"In passenger tires made with 100 per cent synthetic," said Thomas, "I

(Continued on Page 96)

SERVICE HINTS



FROM THE FACTORIES

Removing Chevrolet Door Safety Lock



Loosen the door rubber weather-strip along the door lock pillar in line with the position of the lock in the outer door panel. Using a putty knife or a thin-bladed screw driver under the lip or flanged over section of the lock retainer spring, pry out of the slot about $\frac{1}{2}$ to $\frac{3}{4}$ in. It may also be necessary in some cases, due to a locking step in the spring, to use another putty knife or screw driver between the door flange and spring, forcing the spring slightly inward away from the flange while bringing it out of the slot.

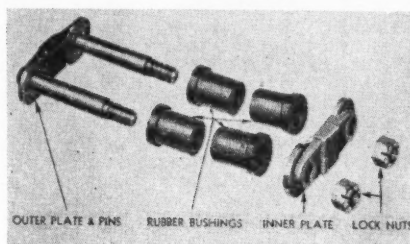
This will release the safety lock, which may now be pulled out of the door panel. While pulling the lock out, it may be necessary to move the retainer spring in or out a little completely to free the lock.

Installing Rubber-Bushed Shackles

Both threaded and rubber-bushed shackles are used at the rear end of the 1941 Chevrolet. To install the latter type, raise the rear of the car high enough to provide the proper distance between the spring eye to install the shackle. Wipe off all excess dirt and grease around the spring and shackle. Install one bushing in the hanger and spring eye with the bushing shoulder, or collar, to the outside of each hole. Insert the shackle pins through the bushings with the attached shackle plate toward the outside of the car, threaded ends of the pins toward the car cen-

terline. Install the inner shackle plate, and tighten the lock nuts about half way onto the pins.

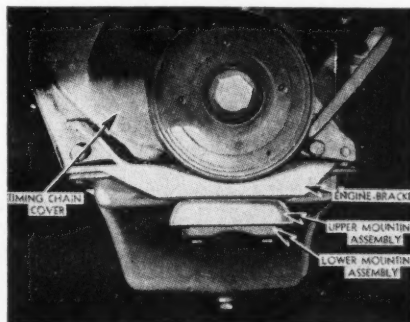
Lower the car and allow to stand normally with the weight on the wheels at curb weight (no passengers or load in the car). Bounce the back end of the car up and down several times to center and seat the rubber bushings. Then, when the car comes to rest normally, tighten both lock nuts until the inner shackle plate bottoms on the shoulder of the pins.



Rubber shackles should never be lubricated and care should be exercised when spraying the springs to prevent oil or grease from getting on the bushings.

Servicing Engine Mountings

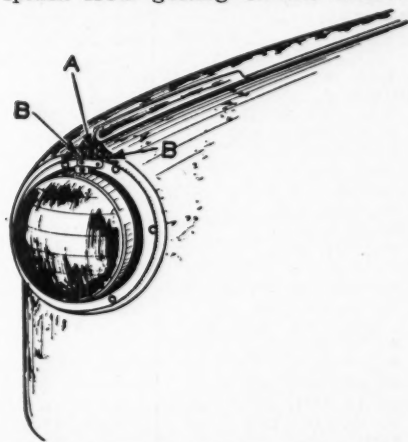
Engine mountings are not interchangeable between the 6 and 8 cylinder Oldsmobile models due to the difference in rubber specifications.



When installing the front engine mountings, the cap screws which fasten the mounting to the frame or bracket, should first be screwed finger-tight. Then take one turn on one cap to tighten evenly in place. Do not tighten one screw more than the other because, if either cap screw is tightened independently of the other, the lower portion of the assembly will not seat evenly in the upper portion. The front mounting must be properly positioned and tightened. Otherwise severe engine roughness will result.

Keeping Fenders Clean

On 1942 Pontiacs the following corrections may be made to prevent road splash from getting on the surface

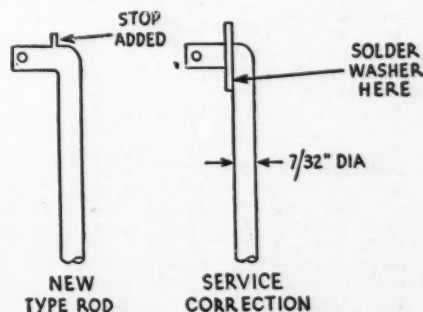


of the front fenders through an opening near the headlamp rim or at the front edge of the fender cap:

To stop road splash from coming through near the headlamp rim, remove the rim and clean all the foreign material from the top of the headlamp. Apply a heavy coating of sealer compound between lamp and fender as shown in illustration.

Sticking Throttle

If alignment of the 1941 Pontiac accelerator cross-shaft bracket and the accelerator pedal rod is not correct, the pedal rod may be forced into the hole in the bracket beyond the right-angle bend on the end and cause the throttle to stick.



To prevent this possibility, a stop has been provided on the accelerator pedal rod. A quick and satisfactory correction can be made in service by soldering a thin washer on the rod.

COOLING SYSTEM CAPACITIES by Makes and Models

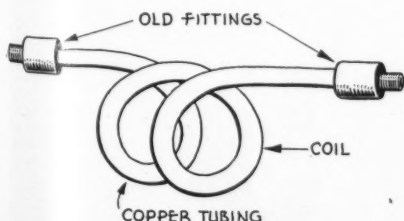
AUBURN	Quarts	CHRYSLER (cont.)	Quarts	HUDSON (cont.)	Quarts	NASH (cont.)	Quarts	PONTIAC (cont.)	Quarts
120, 125, 1929, 1930	25	C-19, 1938	20	10, 11, 12, 1941	13	4180, 1941	16	8, 1935	14
8-98, 1931	21	C-20, 1938	20	14, 17, 1941	18	4240, 1942	14	6, 1936	15
8, 1932, 1933	19	C-22, 1939	17	20, 21, 22, 1942	13	4260, 1942	17	8, 1936	16 1/2
6-52, 1934, 1935	17 1/2	C-23, C-24, 1939	24	24, 25, 27, 1942	18	4280, 1942	16	6, 1937, 38, 39, 1940	16
8-50, 1934, 1935	21	C-25, 1940	18					8, 1937, 38, 39, 40	19
12, 1932, 33, 34	37	C-26, C-27, 1940	24	HUPMOBILE		OAKLAND		6, 1941, 1942	18
6-654, 1936	16	C-28, 1941	18	S, S-2, 1930-31	14	Six	12	8, 1941, 1942	19 1/2
8-852, 1936	20	C-33, 1941	24	C, 1930, 1931	20	8, 1930, 1931	25		
AUSTIN		C-30, 1941	24	H, U, 1930, 1931	28	OLDSMOBILE		REO	
1931 to 1936	6	C-34, 1942	18	L, 1930, 1931	16	1929, 1930, 1931	13	15, 1930	14
BANTAM		C-36, C-37, 1942	26	216, 1932	13	8, 1933, 1934	19	C Fly. Cloud, 20,	
1938	7			222, 1932; 332, 1934	21	F35, F36	13	25, 1929, 30	19
1939	4	DE SOTO		226, 1932; 326, 1934	24	L35, L36, F37	16	6-21, 6-25, 1931	17
1940, 41	5 1/2	Six, 1931, 1932	15	321, 1933	21	L37	20	8-21, 8-25, 1931,	
BUICK		Six, 1933	16	417, 1934; 421-J,		F38, 60, 70, 1938-39	17	1932	16
8-50, 1930 to 1933	12	Six, 1934	20	1934	16	L38	21	8-31, 8-35, 1931	23
8-60, 1930 to 1933	16	Six, 1935	17	427, 1934	24	80, 1939	24	S, 1932, 1933	20
8-80, 1930, 1930		Six, 1936	19	518, 1935	20	60, 70, 1940	17 1/2	Royal, 1932, 33	23
to 1933	19	S-3, 1937	20	321, 527, 1935	24	Cruiser 8, 1940	21	S4, 1934	19
40, 1934	14	S-5, 1938	20	6-618G, 1936	18	6, 1941	18	Fly. C., 1935, 1936	18
50, 1934, 1935	15 1/2	S-6, 1939	19	8-621N, 1936	21 1/2	8, 1941	22	Roy., 1935	20
60, 1934, 1935	18	S-7, 1940	17	6, 1938, 39	18	6, 1942	18 1/2		
90, 1934, 1935	23	S-8, 1941	18	8, 1938, 39	21 1/2	8, 1942	20 1/2	STUDEBAKER	
40, 1935	13	S-10, 1942	18	LAFAYETTE		OVERLAND		Big 6, 1926, 27	19
40, 1936, 37, 38, 39	13 1/2	ESSEX		1934, 1935, 1936	19	1939	11 1/2	Dict., 1928	14
60, 80, 90, 1936		Six	19	LASALLE		PACKARD		Com., 1928	20
1937, 1938, 1939	17	Super six, 1932	17	328, 1929	21	903, 904, 1931	25	Pres., 8, 1928	20
40, 50, 1940	12 1/2	DODGE		340, 1930; 345, 1931	24	Lt. 8, 1932	19	Dict. 6 & 8, 1929	15
60, 70, 1940	16	Vict. 6, 1928	12	1932, 1938	26	Std. 8, 1932	20	Com., 6, 1929	17
40, 50, 1941, 1942	13	Six, 1929, 1930	16	St. 8, 1934, 1935	18	Del. 8, 1932	25	Com., 8, 1929,	
60, 70, 1941, 1942	16 1/2	8, 1930	17 1/2	8-36-50, 1936	16 1/2	12, 1932-36	40	1930	14 1/2
80, 90, 1941, 1942	18	Six, 1931, 32, 33	14 1/2	37-50, 37, 38, 39, 40	25	8, 1933-36	20	Pres., 1929, 1930,	
CADILLAC		Eight, 1931, 32, 33	16	LINCOLN		Super 8, 1934, 35, 36	22	1931	21
370, 1931	26	Six, 1934	18 1/2	8, 12, 1931 to 1933	34	120, 1935	16 1/2	Six, 1930, 31, 32	12 1/2
8, 1932, 33	26	Six, 1935	17	12-1934, 1935, 1936,		120-B, 1936	18	Dict. 8, 1930, 31	18
12, 1932, 1933	24	6-D2, 1936	15	1937, 1938	32	Six-115-C, 1937	17	Com., 70, 1931	14
16, 1932, 1933	28	Six, 1937	16	V12, 1939-40	32 1/2	120-C, 1937	20	Dict., 62	14
355-D, 1934, 1935	20	Six, 1938, 39, 40	15	V12, 1942	27	8-1500, 1, 2, 1937	24	Com., 71	16
370-D, 1934, 1935	19	D19, 1941	15	LINCOLN ZEPHYR		12-1506, 7, 8, 1937	40	President 91	21
452-D, 1934, 1935	23	D22	15	H, 1936, 1937	27	Six, 1938, 39	15	Six 56, 1933	14
V8-60, 1936	30	FORD		1938, 69	30	8-1601, 1701-2,		Com., 1933	16
V8-70, 75, 1936	29	V-8, 1932, 33, 34, 36	22	1940, 41, 1942	27	1938-39	16	Pres. 82, 1933	18
V12-80, 85, 1936	19	V-8, 1935	20	MARMON		Sup. 8, 1938	20	Pres. 92, 1933	23
V16-90, 1936-37	24	V-8-60, 37, 38, 39	15	70, 1931	16	Twelve, 1938, 39	40	Dict. 6, 1934	15 1/2
V8-60, 65, 70,		V-8-85, 37, 38, 39		88, 1931; 8-128, 1932	28	1703-5, 1939	22	Com. 8, Pres. 8	18 1/2
75, 1937	25	40	22	16, 1931, 1932	29	1800, 1940	17	Dict. 6, 1935	16 1/2
V12-85, 1937	17	V-8-60, 1940	13	16, 1933	34	1801, 1940	18	Com., 1935	21 1/2
V8-60, 60-S, 1938	24	V-8-85, 1941	26 1/2	MARQUETTE		1803-4-5, 1940	20	Pres., 1935	21 1/2
V8-65, 75, 1938	25	6 cyl., 1941, 42	17 1/2	1929	12	1806-7-8, 1940	20	Dict., 1936	14
16-90, 1938, 39, 40	30	V-8, 1942	22	MERCURY		1900, 1941	15	Pres., 1936	17
60S, 62, 72, 75, 1940	24 1/2	GRAHAM		8, 1939, 40	22	1901, 1941	17	Dict., 1937	13
60S, 61, 62, 63, 67,		Cust. 8-24, 1931	26	1941	25 1/2	1903, 4, 5, 6, 7, 8,		Pres., 1937	15 1/2
75, 1941, 1942	25	8, 1931 to 1934	20	1942	22	1941	20	Sta. Com., 1938	14 1/2
CHEVROLET		6-74, 1935	15	NASH		Clipper, 1941	17	Pres., 1938, 39, 40	17
1929 to 1933	10	6-73, 1935	17 1/2	Twin 8, 890, 990		2000, 10, 20, 1942	14	9A, 10A, 1939, 40	14 1/2
Std. 1934, 1935	10	8-72, 1935	18	Big 6, 1932	17	2001, 11, 21, 1942	17	G, 2G, 3G, Champ.,	
Master 1934, 1935	11	8-75, 1935	20	Spe. 8, 1932	21	2003, 2, 3, 4, 5, 6,		1940, 41	10 1/2
Std. & Master,		6-80, 1936	11	Adv. Amb., 1932,		7, 8, 1942	20	11A, 1941	13
1936	15	6-90, SC-110, 1936	15	1933	22	PIERCE-ARROW		7C, 1941	15
Std. & Master,		6-85, 1937	11	1120, 1933	19	8, 1929 to 1934	26	4G, 1942	10 1/2
1937, 38, 39, 40, 41	41	6-95, SC-116,		Std. 1933, Spe., 1933	16	12, 1932, 1933, 1934	38	12A, 1942	13
Stylemaster, Fleet-		SC-120, 1937	15	Big 6, 1120, 1934	17 1/2	8-845, 1935	28	8C, 1942	15
master, 1942	15	6, 1938	13 1/2	Adv. 8, 1280, 1934	21	12-1245-55, 1935	40	TERRAPLANE	
CHRYSLER		96 Spec. & Cus.,		Amb. 8, 1290, 1934	22	'8-1601, 1936 &		Six, 1934	18
Six, 1932, 33, 34	16	1939-40	14	6, 1935, 1936	17 1/2	8-1701, 1937	25	Six, 1935	16
Roy. 8, 1933	19	97 Superch. Cus.,		400, 1935, 1936	18	2-1602-03, 1936		Six, 1936, 1937	13
Imp. 8, 1933	20	1939-40	15	Adv. Amb., 1935	21	& 1702-3, 1937	38	VIKING	
Imp. Cust. 8, 1933	27	HUDSON		Amb. Super 8, 1936	21	PLYMOUTH		1929, 1930	33
Roy. 8 CU, 1934	23	6-1935	18	H, 1936, 1937	27	Up to 1931	14	WHIPPET	
CV, CX, 1934	23	8-1935	23	Lafayette 400,		1932	15	96A, 1930	11 1/2
6-C6, 1935	17	8-64; 65, 66, 67, 1936	20	3710, 1937	20	1933	13	98A, 1930	15 1/2
8-CZ, 1935	20	6-63, 1936; 6-73,		Amb. 6, 3720, 1937	17	1934	14	WILLYS	
8-C1, C2, C3, 1935	19	1937	13	Amb. 8, 3780, 1937	18	1935	15	Eight	20
CW, 1935	24	8-74, 75, 76, 77, 1937	20	Lafayette, 1938,		1935, 1936, 1937	15	77, 1933-36	9
6-C7, 1936	19	112, 1938	12	39, 1940	20	1938, 39, 40, 41	14	1937, 1938, 39	11
8-C8, 1936	22	Terra., 1938	12 1/2	Amb. 6, 1938	18	1942	15	1940, 1941, 1942	11 1/2
8-C9, C10, C11, 1936	17	6, 1938, 39	12 1/2	Amb. 8, 1938	20	PONTIAC		WILLYS KNIGHT	
C-16, 1937	20	8, 1938	17 1/2	3920, 1939	16	Up to 1928	10	70, 1926 to 1929	17
C-14, 1937	22	90, 98, 1939	12 1/2	3980, 1939	17	1929, 1931, 1932	14	87, 1930	17
C-15, 1937	21	93, 1939	12 1/2	4020, 1940	17	1930	13	70A, 1928	16
C-17, 1937	17	95, 97, 1939	17 1/2	4080, 1940	18	8, 1932	25	66D, 1931, 1932	17 1/2
C-18, 1938	20	40, 41, 43, 1940	13	4140, 1941	14	8, 1933, 1934	15	95, 1931, 1932	15 1/2
		44, 37, 1940	18	4160, 1941	17	6, 1935	13 1/2		



Here's your chance to pick up a little cigaret money. We'll pay five bucks (\$5.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and faster than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Incidentally we won't accept any that have previously appeared in any other automotive publication. Here are some that were accepted this month.

Substitute Gas Line

We are frequently called on to replace a flexible gas line which has failed in service. In many cases, it is not possible to purchase a new line, so we use the following method as a substitute for a new line: We take the old fittings off the flexible line and sweat them on the ends of a piece of copper tubing. We then bend a

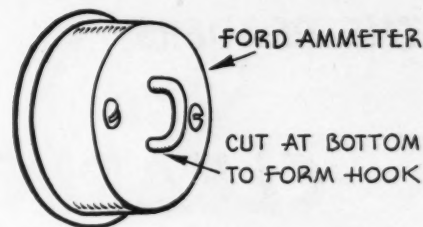


coil in the copper tube to take care of any flexing action necessary.—*Clarence C. Mills, Square Deal Garage, West Norwood, N. J.*

Replacing Bushings

When overhauling the transmissions on Chevrolet passenger cars and half-ton trucks, the countershaft gear bushings are often found to be badly worn when the gears themselves are in good condition. These bushings are not serviced by Chevrolet.

Rather than replace the countershaft assembly, we remove the old bushings and replace them with new bushings under Chevrolet part No. 590236 and hone or ream them to fit the countershaft.—*T. E. Woosley, Brandenburg, Ky.*



Generator Tester

We have made a very handy tester for generator or voltage regulators by using one of the Ford ammeters that has the loop on the back, through which generator wire passes. We cut the loop at the bottom so as to form a hook. You can hang this ammeter on any wire to be tested and get a reading without even disconnecting the wire.—*R. O. Griffith, Magazine, Ark.*

Cutting Round Gasket

When making gaskets of soft material for carburetors, water manifolds, etc., I found the most difficult part of the job was to cut a perfectly round hole in the center of the gasket.

By laying the gasket material on a board and driving a nail through the center of the part to cut out, you have an axis on which to revolve the gasket. Insert a very sharp knife blade through the gasket material at the edge of the circle to cut and revolve the gasket around the nail. A perfect hole will be cut easily and quickly.—*Joe Swanson, 303 W. Cherry St., Mt. Pleasant, Mich.*



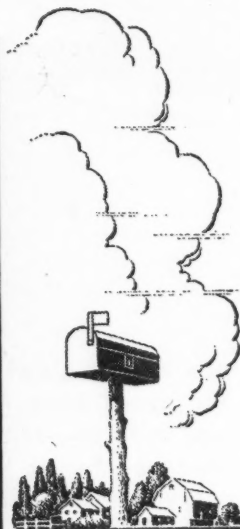
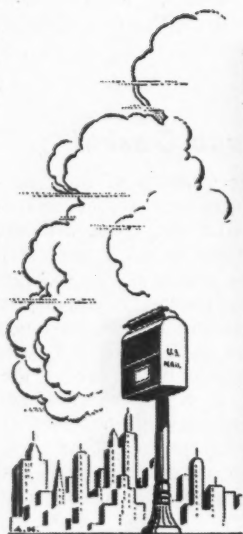
Repairing Wipers

We have found that, when vacuum-type windshield wipers become sluggish or will not run but will return to the off position, we are very often able to make them operate normally by using a small-diameter wire to punch out the gasket which has swelled and closed the vent hole in the cover over the wiper motor valve assembly.—*L. W. Payne, Box 56, Cortland, Ohio.*

THE READERS'

CLEARING HOUSE

of Servicemen's Queries



Bill Toboldt, Editor, Motor Age

High Oil Consumption

I put a new set of piston rings, piston expanders, oil-control rings on the intake valves and cleaned carbon and resealed valves in a 1934 Plymouth, as well as a new set of connecting rod bearings. This was done at 21,950 miles, and to-date the car has been driven 26,511 miles, or some 4,500 miles since the job was done.

The engine does not smoke, and runs fine, but it uses 3 qt. of oil in 1,300 miles. There is a little oil leak at the rear main bearing. What can I do to stop this oil consumption?—A Minnesota Subscriber.

YOU have answered your own question when you say that there is an oil leak at the rear main bearing. Assuming the work you describe was properly done, the fact that the car does not smoke, indicates that the oil you are losing is due to the leak at the rear main bearing. You realize, of course, that the oil will leak out in a much greater quantity when the engine is running at a higher speed

than it will when the engine is idling, which is the speed at which you noticed the oil leak.

The answer, therefore, is to fix the leak and you will lick your trouble.

Reversing Battery

Will you please help us settle a question? If the battery is installed in a 1939 Ford in reversed polarity and the car is run for approximately 200 miles in two weeks time, will this reversed polarity cause the voltage regulator to burn out and in turn cause the armature in the generator to heat up and burn out?—H. S. Cramer, 216 N. Fairview Ave., Freeport, Ill.

ON the old type three-brush generator, to install a battery with the terminals reversed would cause no damage to any of the electrical units. The only result would be that the ammeter on the instrument board would be indicating discharge when the battery was actually being charged. However, when the electri-

cal system is equipped with a voltage regulator, it will cause the regulator points to burn out and quite possibly the generator would also be damaged.

Clutch Vibration

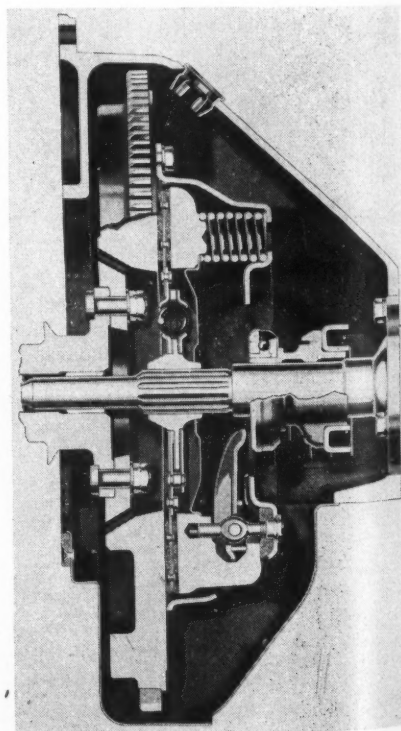
I would like to know if you can help me with a 1941 P12 Plymouth sedan, which has an annoying vibration at 25 m.p.h. when pulling. It seems as if the clutch slips at the same time.

About seven months ago, a new clutch was installed and a metal disk was removed from the pressure plate, a step recommended by a Plymouth dealer. The car was all right for about six months and has developed the same vibration noise again.

I have removed the clutch and checked the pressure plate which seems O.K. and have also checked the drive shaft. The car has only been driven 12,000 miles.—Thomas Nagle, Collegeville R.D. No. 1, Pa.

IN reference to the trouble you are having with the clutch on a 1941 Plymouth, I would suggest that, first of all, you have the fingers checked and reset on a regular clutch-rebuilding fixture. Also make sure that the surface of the flywheel is smooth and without any ridges. It is also important to make sure that the clutch shaft is not bent and that the transmission is in correct alignment with the flywheel. Occasionally, defective engine mountings will also cause the trouble you are describing as will worn shackles in the rear springs.

However, considering the mileage you have on this car, I am more inclined to think the trouble is caused by incorrect adjustment of the fingers on the pressure plate or misalignment of the transmission.



Octane Selector

Will you please tell me why the vacuum advance unit on a 1934 Chevrolet Master won't work? Have installed a new unit, the line is tight with no air leaks, and the line is free of obstructions. Still the unit will not operate.—A North Dakota Subscriber.

I AM inclined to think the trouble you are experiencing with that vacuum-advance unit on the 1934 Chevrolet is caused either by a leak in the vacuum system or by a frozen distributor advance plate.

My suggestion is that you check carefully for vacuum leaks and also disassemble the distributor so as to make sure that all moving parts are free.

Shift Mechanism Locks

I have a 1939 Packard. When shifting from low to second, the shifting mechanism seems to lock, and I have to jiggle it around to make the shift. Can you tell me what is wrong?—A California Subscriber.

THIS condition is likely caused by the fact that the shift levers at the bottom of the steering column do not line up in the neutral position. I suggest that you bring these levers together and insert a pin through the aligning holes to hold them in this position and then disconnect the shifting levers from the rods at the transmission. Then adjust the short rod between the operating levers, which are just ahead of the transmission, and the levers at the bottom of the steering column. This adjustment should be made so that, with the operating levers in neutral at the bottom of the steering column and the levers on the transmission also in neutral, the rods are the right length to permit the clevis pins to enter the yokes.

Engine for Combine

I am considering using a Model A Ford as a power unit for combines. Could you tell me the maximum r.p.m. and the r.p.m. at which I would develop the maximum power for belt use?

If I used the transmission, what is the ratio I would get in reverse, low and second gears?—Everett Ahrens, Basom, N. Y.

THE Model A Ford engine developed a maximum horsepower of 40 at 2200 r.p.m.

I am sorry I do not have the ratio of the transmission at various speeds; however, you can easily obtain this by counting the number of teeth in the gears.

Model A Ford engines have been frequently used as power units and

have in general given very satisfactory service. The only precaution necessary is to have a radiator of sufficient capacity to keep the engine from overheating. In making up such power plants, a large size truck radiator is generally found to be of advantage.

Leak in Rear Main

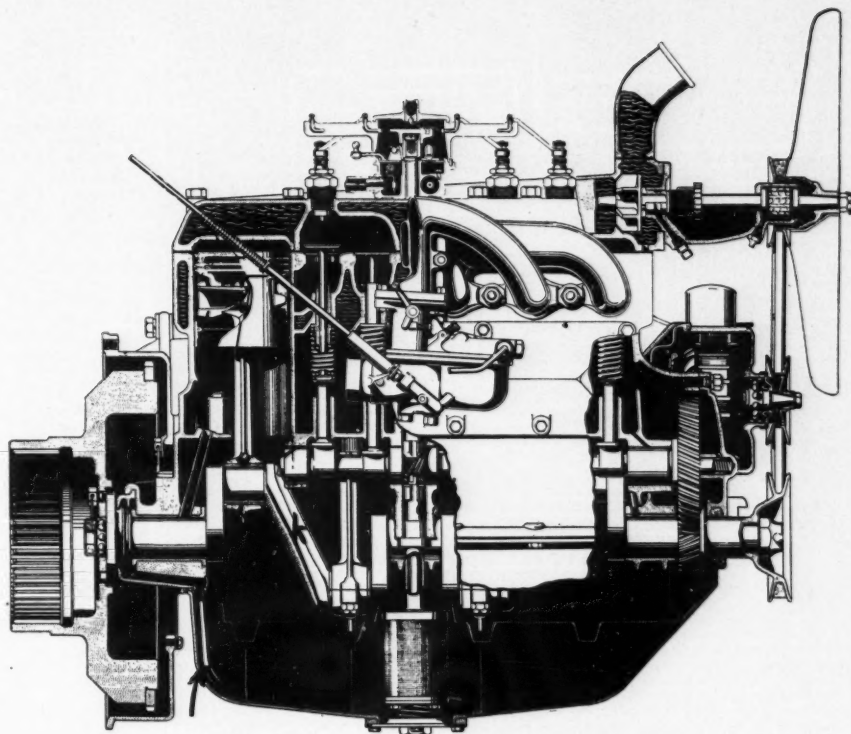
We have a Chevrolet truck, 1930 model, that has an oil leak, which I think is in the rear main bearing. What type of bearing is in this truck?

Will you tell me an economical way to overcome this difficulty? This truck is 13 years old and we do not care to spend much money on it.

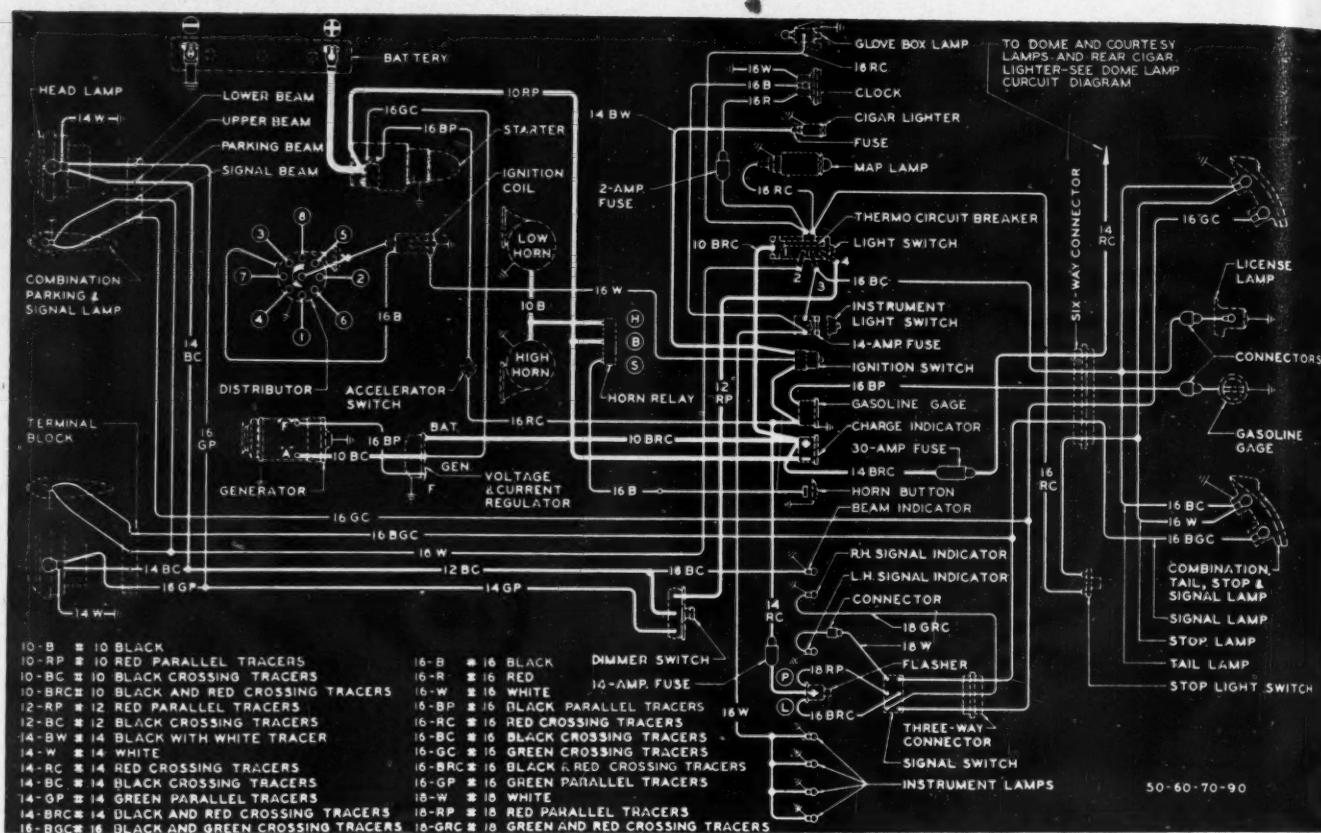
How much clearance is allowed for the crankshaft end play and which bearing absorbs the thrust?

We also have a Packard 120 station wagon, Model 1941, which is equipped, I believe, with a Stewart-Warner, series 645-E electric windshield wiper. I am having trouble stopping the electric motor on the wiper. I am able to stop it only temporarily, because in a few days the same trouble appears again. I will appreciate it very much if you will send me a diagram and any other information that will help me overcome this difficulty.—A North Chicago subscriber.

ON the 1930 Chevrolet that is leaking oil at the rear main bearing, I would suggest that you remove the ball check in the rear main bearing cap and drill out the hole to about 5/16 in. diameter. Do not replace the ball check. Then install a new center main-bearing and adjust end play to .004 to .006 in. and adjust all main bearings. Make sure the breath-



Joe Lo Burch



Wiring Diagram, 1942 Buick, Models 50, 60, and 90

er is not clogged up, causing excessive pressure in the crankcase.

The trouble you are having with the electric windshield wiper on the 1941 Packard is probably due to either a defective circuit breaker or a short-circuited switch. When the wiper is turned on for a few seconds and then shut off these wipers will run for two or three strokes of the blade before stopping. This is a normal condition.

Piston Slap

I have a 1930 Packard that was just overhauled. New rings, pins and connecting rods were installed, and now the engine has a piston slap. What would you suggest as the best way to overcome this condition?—A Pennsylvania Subscriber.

CONSIDERING the age of this car, I believe the best thing to do is to pull the head and pistons, recondition the cylinders and install oversize pistons. Much would depend, of course, upon the amount of wear that has taken place.

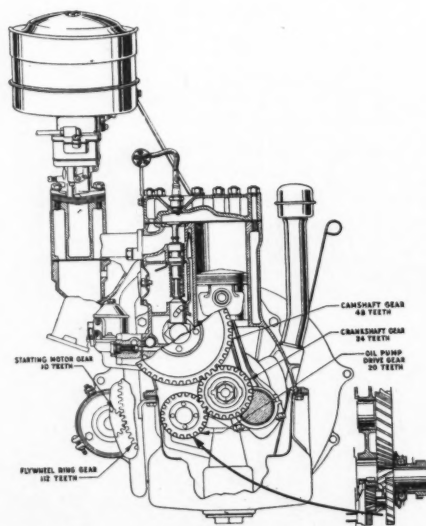
Stubborn Oil Leak

On a 1941 Model Ford Six car, which has gone 24,000 miles, I have ground valves and replaced inserts and installed new rings. The motor still uses oil and, as it is the first one I have worked on, I would like

your help.—George Christensen, 3529 Josephine St., Lynwood, Cal.

IT is rather difficult to understand why your passenger Ford Six should continue to use oil after you replaced bearing inserts and installed new rings. However, I would suggest that you check the cylinders for out-of-round and taper. If this proves to be excessive, it would, of course, be necessary to correct this condition.

From your letter, I am not quite sure whether you replaced just the connecting-rod bearings or whether you replaced the main bearings also.



In either case, I would suggest that you make an oil-pressure test on this engine to see if there are any oil leaks present.

Jumpy Steering

I have a 1939 Ford 85 on which I am having trouble with the steering. I have a complete wheel-aligning outfit and have checked caster, camber, toe-in and king-pin inclination, and have balanced the wheels. I have installed new king pins, new shocks, new front spring and new tie-rod ends. There is nothing sprung or bent.

On a smooth or wavy road, the car handles all right but, when driving over 30 m.p.h. on a road that is just a little rough, or on a concrete road that has rough joints, you can't hold the steering wheel. When you hit a joint in the pavement that you ordinarily would not notice, the steering wheel shakes or vibrates.

I have watched the front wheels, and they seem to jump when you hit the rough spot, and then shimmy for a second. Then they straighten out until you hit another rough spot. The car doesn't weave or wander.—A Florida Subscriber.

ALTHOUGH you mention that you have checked wheel alignment and have balanced the wheels, you do not mention that you have done anything to the steering gear itself. It

seems to me that, if you are sure the front alignment points, such as caster, camber, toe-in and king-pin inclination are correct, your trouble is located in the steering gear. This gear should be set up so that there is no play in a straight-ahead position. I believe, if you will adjust this steering gear according to the regular procedure, you will be able to overcome this trouble.

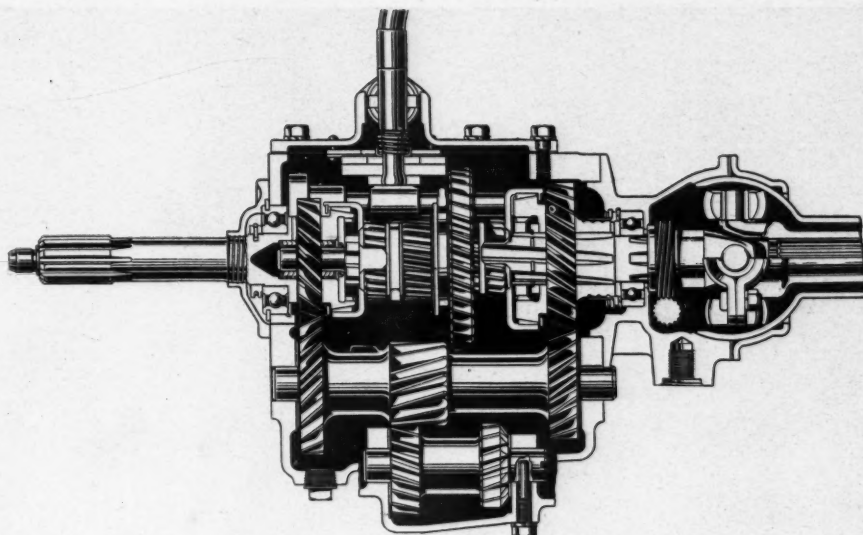
Oil Pressure Drops

I have a 1937 Plymouth which will lose its oil pressure when warmed up. Would have advise new inserts or use a .002 or .003 shim stock back of the old inserts? If shim stock is used, should the inserts be dressed off even with the cap or left as is?—F. J. Kathmann, Templeton, Ia.

BEFORE replacing any parts on your 1937 Plymouth I would suggest that you first of all make an oil-pressure test on the engine to see just where the oil is leaking. If you do not have the necessary equipment, I am sure you can borrow it from some local automotive jobber, as most of them have such equipment available. The test will show just where the oil is leaking and, in that way, you can determine just which parts have to be replaced.

In the case of Plymouth cars, it frequently happens that the camshaft bearings are the ones at fault. This can be overcome by installation of either a new camshaft or the installation of special control jets. The test will also show, of course, whether the main bearings or rod bearings have to be replaced.

However I strongly advise against the use of shim stock behind the old bearings. Furthermore considering the age of this car it is not impossible that the crankshaft should be re-ground.



Jumps Out of Gear

We have a 1936 six-cylinder Pontiac which, when going down a steep hill, will pop out of third gear before you reach the bottom. Under no other conditions can you force it out of gear unless great effort is used.

We overhauled the transmission and the only part that showed any wear at all was the sliding sleeve, and the three springs which were broken. We replaced the springs and the sleeve, but it still jumps out of high gear.—A New Jersey Subscriber.

FIRST of all, the main-drive gear bearing may be worn, allowing enough movement of the gear to permit the sleeve to walk out of mesh. I suggest that you check this bearing, and, if there is any play between the balls and the races, replace the bearing with a new one. Next, examine the main spline-shaft bearings, front and rear, to see if sufficient wear is present to permit the shaft to float endwise or to move up and

down. If so, these bearings should be replaced.

If you are unable to locate trouble at these points, then the condition can be due to misalignment between the transmission case and the flywheel housing. Take a gasket that goes between the case and the housing, tear it in half horizontally, and install the lower half only. This will raise the rear of the transmission with respect to its alignment with the housing, and may correct the trouble.

Also check the poppet ball and spring which fits the notch in the shifter fork rail to be sure it has enough tension to hold the rail firmly in position. It sometimes helps to cut the notch a little deeper.

Flat Spot

I was working on a 1942 Chevrolet motor that has a flat spot in it at all speeds up to 35 miles, then it levels out and seems O.K. Everything that is connected with the operation of the motor was changed and tested except the camshaft and cam gears. Could this be the trouble? This is a new motor, never in service.

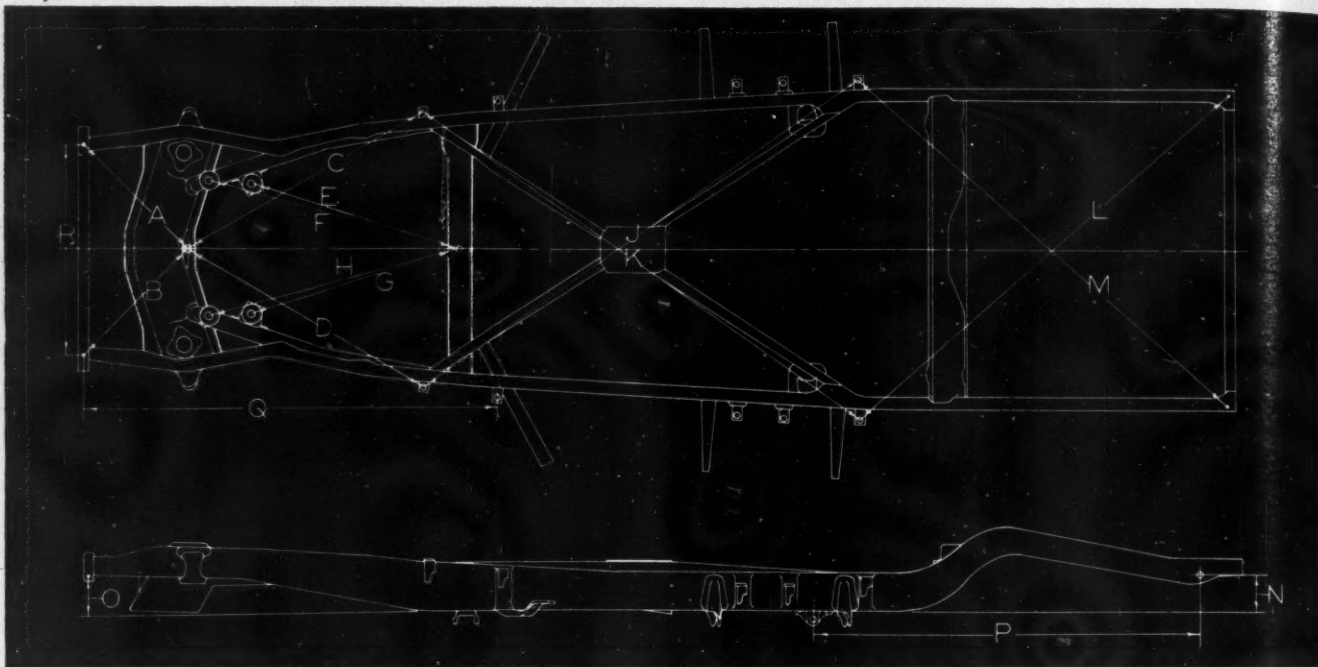
If you can give me a pointer it will be appreciated, for I handle these motors every day.—Robert L. Knop-ton, 3128 Ononta Ave., Cincinnati, Ohio.

DO not think it probable that the difficulty you are experiencing with a Chevrolet engine is a result of a non-standard camshaft. I am more inclined to believe that, somehow, you have neglected to make a complete check or have made an incorrect adjustment which would result in the trouble you have described.

I would suggest that you start from scratch once more and check valve timing, ignition timing, tappet clearance, spark-plug gap, and carburetor, also the possibility of any leaks in the intake manifold system and the



"This is nothing—
Tom Mason's got
a new Grade 1
tire."



Frame Diagram, 1942 Hudson, Model 21

A-21 3/16 B-21 3/16 C-39 25/32 D-39 25/32 E-30 31/32 G-30 31/32 J-78 3/4 K-78 3/4 L-74 41/64 M-74 41/64
N-4 15/16 O-5 49/64 P-57 5/64 Q-59 15/16 R-30 1/2

possibilities of any back pressure from the exhaust.

I am inclined to think that the most likely cause of your trouble is defective carburetion. Incidentally, spark-plug gap on these engines is .040 in. When this car was first released from the factory an AC type 44 plug was standard. More recently this was changed to an AC type 104. Intake tappet clearance should be .006 in. and the exhaust .013 in. Compression pressure is 112 lb. at cranking speeds. Set the breaker points to .018 in. and the points should open one degree before top center, or when the steel ball in the flywheel lines up with the center of the timing hole.

If you do not have an exhaust-gas analyzer I would suggest that you borrow one to make sure of the carburetor adjustment. You might also try operating the car with the muffler disconnected, so as to be sure that the trouble is not caused by back pressure.

In regard to the carburetor, you probably recall that Chevrolet has what is called the economy model, mostly used by fleet operators. Carburetors on such jobs have a special metering rod designed to give better fuel economy. Of course, this is done at the sacrifice of performance and it is not impossible that you have one of these units.

Fouls Spark Plugs

We have several 1941 Buick and Chevrolet cars that foul spark plugs. Clean the ones that are missing and

then the car will run O.K. for a few days and then another plug will foul. The cars do not use much oil, maybe 1 to 2 qt. in 1,000 miles. Can you suggest a remedy for our troubles?—E. M. Phillips, Hickory, Pa.

AFTER studying the description you have given of the trouble you are experiencing on the 1941 Buicks and Chevrolets with fouling spark plugs, I believe you can overcome the trouble by using spark plugs of the correct heat range.

In this connection, I would suggest that you go to your local automotive jobber and obtain new plugs of the correct heat range for these particular cars. All the spark plug manufacturers have special plugs for use in these cars.

Increasing Compression

I have a customer who wants me to increase the compression ratio of his 1936 Ford V-8 engine. Can you give me full details and specifications for planing off the heads? Should I change the timing, valve lift, etc.?—A California Subscriber.

THE present ratio is 6.3 to 1. This can be increased to 7 to 1 by planing .075 off the heads. You will have to watch the clearance of the valves in the combustion chamber to be sure that they do not hit the head in the wide-open position, but it should not be necessary for you to change the valve lift. You should retard the ig-

nition timing to 2 deg. before top center instead of 4 deg., which is the present setting.

Mileage Drop

I recently tuned up a 1935 Ford V-8 engine, after which the owner got a little better than 17 miles per gallon. Since then the car has been driven 400 miles, and now the car is delivering only about 13 to 14 miles per gallon.

During this period of 400 miles, the aluminum cylinder head cracked, and the owner bought a cast-iron head to replace it.

Do you think the cast-iron head has something to do with the drop off of mileage?—A New York Subscriber.

IT is entirely possible that the installation of the cast-iron head in place of the aluminum cylinder head reduced the fuel economy of your customer's Ford V-8. You could undoubtedly improve this mileage by retiming the distributor. However, if he installed only one cast-iron head, which you imply in your letter, I am inclined to believe that it would be very difficult to get satisfactory performance under these conditions. If he is using one cast-iron head and one aluminum head, I would suggest that you advise him to change so he uses the same type of head on both banks of engine, and then tune the engine and pay particular attention to the distributor advance.

George Washington's Farewell Address

THE alternate domination of one (political) faction over another, sharpened by the spirit of revenge natural to party dissension, which in different ages and countries has perpetrated the most horrid enormities, is itself a frightful despotism. But this leads at length to a more formal and permanent despotism. The disorders and miseries, which result, gradually incline the minds of men to seek security and repose in the absolute power of an Individual: and sooner or later the chief of some prevailing faction, more able or more fortunate than his competitors, turns this disposition to the purposes of his own elevation, on the ruins of Public Liberty.



Crankshafts

(Continued from page 45)

bearin's in that engine, now would it?" "I don't see why it wouldn't help some. Them bearin's is pretty well shot."

"It wouldn't help none a tall. Put a perfectly round pair of bearin' halves around an egg-shaped journal and you've still got a channel on both sides for the oil to get through."

"Then," said Horace, scratching the point of his jaw reflectively, "I guess we'll have to get a new crankshaft."

"Maybe you ain't heard what's goin' on over in Italy and in the South Pacific. We can't toss away crankshafts in wartime because they're out of round."

"You couldn't grind that crank-

shaft enough to lick the trouble," said Horace. "And, anyhow, I don't believe there's a crankshaft grinder in Glenrock."

"You couldn't be no more wrong if you was a Jap," said Pop. "Jack Davis, the jobber, put in a crankshaft grinder last month. And we can grind the crankshaft as much as we please. Of course, we'll have to build it up first."

"How do you mean, build it up?"

"Spray it with metal."

"Oh. A half-sole job, huh?"

"Absolutely not. Metal sprayin' is one of the best salvage methods that ever came along. Jack Davis can spray a layer of metal on a crankshaft that'll be as good as the original shaft. In fact, when he gets through, the shaft'll be a solid piece of metal—oversize but still sound. Then all he has to do is put the shaft on the grinder and grind it down to size."

"Pretty slick," admitted Horace. "But how's Davis gonna get his money out of a machine that costs as much as a crankshaft grinder? There ain't many people willin' to spend that kind of cabbage to fix up a jalopy."

"A crankshaft grinder ain't expensive when you figure the volume of work it can handle. And the volume's gettin' bigger. Owners are beginnin' to realize you can't keep old cars runnin' unless you spend the money to fix 'em up, and they're willin' to spend whatever it takes."

"You mean even that misnamed old scalawag, Caleb Spender?"

"If you break it to him gently."

"He'll squawk like a plucked rooster."

"Not if you handle him right. Call him up and—"

"Me call him up? Me?"

"All right. It's my job. I'll call 'im. I'll think of a way to let 'im down easy."

Pop disappeared into the office. After a few minutes, he returned, beaming.

"Got away with it, he?" said Horace.

"It was like takin' Italy from the Italians. He calmed down when I told 'im how little it was gonna cost. And when I told 'im it would mean gettin' another car if he didn't get the job done, why he just gave up."

Merger Dropped

In a declaration of policy adopted at its meeting Sept. 2 at Chicago, the Motor and Equipment Wholesalers Association asserted that, while it favors merger with other wholesale groups, it could not consider a merger with any body that included manufacturers. The declaration followed earlier efforts to effect a consolidation of the MEWA and the National Standard Parts Association. The latter advised the MEWA that the proposal had been voted down at an NSPA meeting in July.

The MEWA is a present launching a campaign emphasizing the important rôle of the automotive jobber in wartime and post-war business and the necessity for close cooperation between jobber and dealer. The campaign is spearheaded by a series of mailing cards to jobber customers.

Rejoins Spark Plug Division

Charles Schuler has returned to Edison-Splitdorf Corp. as district manager of the Spark Plug Division in the East Central territory. Schuler, who is well-known throughout that section, was granted a leave of absence by Edison-Splitdorf about four months ago so that he might take on a special assignment for Packard Motor Car in Detroit. Packard has now released "Charlie" and he is "back doing business at the same old stand."

War and Winter Tune-up

(Continued from page 39)

result of alloy steel valves and hardened seats, the tappets seldom require adjustment. While such improvements in valve materials have lengthened the mileage interval between tappet adjustments, tappets still require adjusting. Otherwise, economy will be sacrificed.

Turning now to the preparations of the cooling system for winter driving, it is extremely important that a careful and complete job be

performed. If adequate precautions are not taken, not only will anti-freeze be wasted but there is also a possibility of cracking the water jackets and this in turn may result in the loss of the use of the vehicle for the duration, as the supply of parts is limited.

Before filling the radiator with anti-freeze, it is first necessary to remove any accumulation of rust and scale from the complete cooling system. In most cases, this can best be done by using the special chemicals and compounds which have been designed for the purpose and which can

be secured from any automotive jobber. It must be remembered that, when flushing the cooling system, this should be done in a direction the reverse of the normal. In other words, the flushing water should pass from the bottom to the top of the radiator, while the cylinder block should be flushed from the top to the bottom.

The complete cooling system should also be checked for leaks, and the hose connections should be examined to make sure they have not deteriorated. When checking for leaks, in addition to the hose connections, water pump, radiator and gaskets, the freeze plugs in cylinder head and block should be examined. If there is any trace of rust around the freeze plugs, new ones should be installed. Make sure that the water pump is circulating the water and also that the fan belt is adjusted to the proper tension and is not frayed.

Many engines are fitted with water-distribution tubes in the water jacket. If these are corroded, valve seats will overheat and valves will soon burn.

It is also important that the thermostats be checked to make sure they are opening at the right temperature. Defective thermostats will result in either overheating or excessive cooling and, in either case, the efficiency of the engine will be reduced.

After the cooling system has been cleaned and any leaks eliminated, the required amount of anti-freeze may be poured into the system. If the anti-freeze was saved from last year, it is necessary to use additional inhibitor according to the latest advice from the government.

The only remaining items to check when tuning a car for winter are wheel alignment and lubrication. Because of the importance and detail required by these subjects, they are covered in separate articles in this issue.



A STIFF COURSE AHEAD

Win the Post-War Competitive Race with Products Manufactured by Sinko!

OLD, pre-war products are going to present an out-dated appearance under the flood-lights of the streamlined, post-war store! They'll be dust-gatherers on the back shelves, shouldered aside by merchandise designed for modern eyes, modern tastes and modern tempo.

That's why plans and preparations are under way for the most spectacular line of SINKO Automotive POST-WAR PRODUCTS ever conceived. The SINKO line of automotive specialties was always a big, profitable seller for many progressive dealers. Finest quality, performance, precision construction, color, modern materials and design, eye-catching packaging . . . everything required for successful sales appeal, and for the consumer's satisfaction will more than ever characterize the new post-war SINKO line. Altho buried deep in war production today, you can depend upon us to be ready to help YOU get off to a flying start, catching the eyes and the dollars of merchandise-hungry customers when the fighting ends.

PRECISION ENGINEERED

Sinko
AUTOMOTIVE SPECIALTIES

MODERATELY PRICED

SINKO TOOL AND MANUFACTURING CO. • 351 NO. CRAWFORD AVE., CHICAGO, ILL.

Launches Tire Campaign

The Mansfield Tire and Rubber Co., Mansfield, Ohio, manufacturers of Century, Richland, United and Mansfield tires, distributed nationally to independent tire retailers exclusively through automotive, petroleum, and hardware wholesalers, releases this month an extensive campaign of business-magazine advertising, using double-spread color pages in 21 publications.

Primary objectives of the campaign, which will be supported by direct mail and broadsides to more than 4000 salesmen of the wholesalers distributing Mansfield tire lines, is to establish highest appreciation in the trade of Mansfield's method of distributing tires exclusively through wholesalers; and also to build cumulative favorable impressions helpful to the establishment of sales outlets for post-war tire business.

AT McQUAY-NORRIS



Tomorrow's job is important, too!

Right now, of course, our job is doing our part to help win the war . . . not only making parts for our fighting machines, but also cooperating with your McQuay-Norris jobber to help you repairmen and car dealers keep America's cars, trucks and tractors rolling on the home front. And after the war, as a result of the experience we are gaining now, you can count on your jobber to supply you with even finer McQuay-Norris precision replacement parts.

Always call your McQuay-Norris jobber first.

McQUAY-NORRIS
ALTINIZED
Engineered Set
PISTON RINGS

McQUAY - NORRIS

PISTON RINGS • PISTONS • PINS • VALVES
BOLTS • BUSHINGS • SILENT-U SHACKLES



BEARINGS • PUMP PARTS
WHEEL SUSPENSION PARTS

Debt to Parts Makers

(Continued from page 36)

mobile makers of the new ideas so generated. They were needed to effect a greatly desired increase in performance and dependability. Later there was a period of hesitancy which resulted from the fact that the demand from potential buyers of automobiles for anything that would run was so great that hardly more than runability was required in order to make sales. Such things as self-starters, closed bodies, electric lights, shock

absorbers, windshield wipers and most of the comfort- and convenience-providing accessories had to work their way into the list of items of regular equipment through the so-called after-market. It was through the purchase and use of these devices by automobile owners that new standards and higher requirements of motor vehicle performance were set, with the result that car manufacturers adopted and adapted them gradually and thereby increased the number and effectiveness of their selling arguments.

And so it has gone right up to the present day. So it will go in the

years to come, if past history is a safe guide to present judgment, with the industry as a whole working together to meet the new conditions and requirements of tomorrow; with the men in the complete vehicle plants supplemented by the men in the plants which produce parts, accessories, materials and shop equipment. By exchanging experience, swapping ideas and encouraging cooperation, the expense of research and experimentation and the burdens of overhead may be spread, costs kept down, invention stimulated and progress expedited.

The most important contributions of the parts, accessory and materials manufacturers are not the things which they ship as original equipment or as raw material to the complete vehicle makers, as replacements to the after-market, or as tools to the maintenance fields. They are, instead, the ideas for improved performance, for better manufacturing processes or for better service methods which grow out of specialized "know-how", out of the dollars and the time and brain energy consumed in the engineering departments, the experimental laboratories and the conference rooms of the specializing manufacturers. With thousands of trained minds segregated into hundreds of groups, each group devoting its attention to some particular problem, progress is tremendously accelerated and things otherwise undreamed of become beneficent realities.

The industry, the automobile user and the country as a whole owe more to the parts, accessory, materials and shop equipment manufacturers than can ever be repaid.

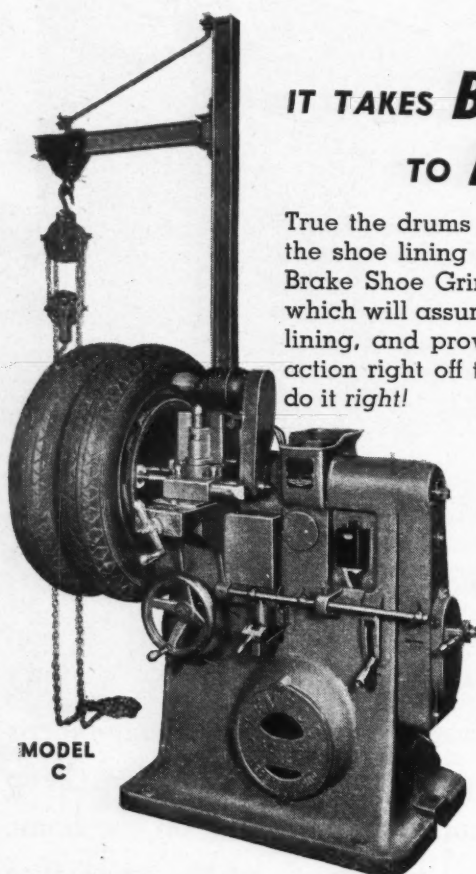
Willys Sales at Peak

Reporting sales at a new peak, the statement of Willys-Overland Motors for the nine months ended June 30, 1943, released today by Ward N. Canaday, chairman, and Joseph W. Frazer, president, showed consolidated net income of \$2,139,644 after providing \$14,123,000 for federal normal, surtax and excess profits taxes and \$4,666,411 for reserves.

The earnings, which were equivalent to 1.7 per cent of sales totaling \$123,921,920, compare with net income of \$1,164,543 in the first nine months of the previous fiscal year, when taxes amounted to \$3,741,359.

Sales were up 75 per cent over volume for the nine months ended June 30, 1942.

In a statement accompanying the announcement of earnings, favorable progress was reported in research designed to adapt the jeep engine to industrial as well as automotive uses. "It is hoped," the statement said, "that this project, besides adding to the war effort, will make a real contribution to utilization of facilities for peacetime production and employment at the proper time."



IT TAKES BOTH TO MATCH THE ARCS

True the drums on a Lempco lathe. Then grind the shoe lining to a matching arc on a Lempco Brake Shoe Grinder. This is the only procedure which will assure full contact between drum and lining, and provide efficient, trouble-free brake action right off the bat. It's the quickest way to do it right!



DOTTED LINES INDICATE DRUM

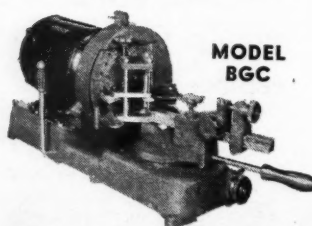
A Only Center of "Standard" Size Shoe Contacts Trued Drum

B Only Ends of a Sprung Shoe Contact Drum

MODEL C DRUM LATHE

Turns and grinds, wet or dry, even extremely large truck drums complete with dual wheels and tires. Available with or without turret grinder, wet grinding attachment, crane, trolley and hoist, equipment for wet grinding clutch pressure plates.

11 DIFFERENT MODELS
OF LEMPCO LATHES FROM
\$335.50 TO \$2900



BRAKE SHOE GRINDER

Only two mounting clamps required for both passenger car and heavy trucks! Grinds shoe lining to same arc as the trued drum, within a thousandth of an inch—but fast!

JUNIOR MODEL BGD \$173.50

SENIOR MODEL BGC \$385.00

Prompt Delivery! Priorities Can Be Had - Write Us.

LEMPCO

PRODUCTS INC.
BEDFORD · OHIO · U.S.A.
ESTABLISHED 1919

SEE ONE WORK - MAIL THIS COUPON

Lempco, Dept. MA, Bedford, Ohio
Gentlemen: Without obligating me in any way tell me shop nearest me where I may see Lempco brake equipment.

NAME
ADDRESS
CITY STATE.....

WAR is an acid test of business men.

Some automotive maintenance shops just folded up. Others made the grade for a time, then gave up. Many who have survived are stronger today than ever.

These shops are doing a profitable business. They are helping to win the war. They are keeping America's 34 million vehicles on the roads. They are servicing both on and off-the-highway vehicles, on which America's continued war effort is based.

Today's successful shops are operated by men who have adapted themselves to each new condition as it arose, accepting the challenge of each new necessity, and overcoming it by common-sense and ingenuity.

These men use The Landis Plan, which calls for doing a complete motor overhaul job when needed—the only kind wanted today by owners of cars, trucks, and tractors.

They send crankshafts to be reground by a Landis-Equipped machine shop where they know factory precision is duplicated.

By so doing they know that the backbone of the engine—the crankshaft—will be restored to its original precision accuracy and the engine to efficient operation. They go farther, and examine every moving part, and recondition and replace each part where this is required.

The result has been more work than most of them can handle, satisfactory profits, and even more important, a development of customer goodwill that will be their most valuable asset after the war.

There is a Landis-Equipped Machine Shop near you which will regrind your crankshafts to original factory accuracy. If you cannot locate the shop, please write us.

LANDIS TOOL COMPANY
WAYNESBORO • PENNSYLVANIA
416

Regrind **CRANKSHAFTS**



The
**Sign of a
LANDIS
-Equipped
JOBBER**

Precision Grinding

as done by a
Landis-Equipped
Shop means the
duplication of
original factory
accuracy.

Landis grinders
can recondition
crankshafts with
precision because they
are similar to
the machines that are
used by most
manufacturers.

Be sure your
crankshafts are
reground for
precise accuracy
—the Landis Way.

Chronological Record

(Continued from page 37)

Production of replacement parts for medium and heavy trucks during the third and fourth quarters of 1942 was limited to 125 per cent of such parts sold by the manufacturer during the corresponding quarter of 1941 unless the inventory of finished parts in the third month of the quarter exceeded four times the monthly sales during the preceding quarter. If more than a four-month inventory was on hand, production was limited to 75 per cent of the parts sold during the corresponding quarter of 1941, with the proviso that total parts inventory at the end of each quarter could not exceed such inventory at the beginning of the quarter. Turn-in of a used part was required on delivery of a new part by a distributor. Effective Aug. 15, 1942, distributors in the Eastern and Central time zones were limited to a 60-day supply of replacement

parts and in other time zones distributors were limited to a 90-day supply.

Aug. 1—Amendment to L-158: Procedures of **REPLACEMENT PARTS** were allowed to schedule their production as A-1-a without regard to orders or contracts placed with them for material on lower ratings.

Aug. 29—Limitation Order L-180: Production of replacement **STORAGE BATTERIES** for motor vehicles from July 1 to Sept. 30, 1941, was limited to 45 per cent of the batteries sold from July 1 to Dec. 31, 1941. From July 1 to Dec. 31, 1942, production of replacement batteries was limited to 90 per cent of the batteries sold from July 1 to Dec. 31, 1941. Distributors were limited to a 60-day supply of batteries based on 1941 sales.

Sept. 1—Amendment to L-158: Manufacturers were permitted to schedule their production of **REPLACEMENT PARTS** as if they carried a rating of AA-2-x, the highest civilian priority rating available under PRP.

Dec. 12—Amendment to L-158: Production of **FUNCTIONAL REPLACEMENT PARTS** was extended to the first quarter of 1943, being based on a percentage of the average

calendar quarter of 1941 rather than the corresponding quarter. Producers having more than a four-month inventory of parts for medium and heavy trucks were allowed to produce up to 100 per cent of the average calendar quarter of 1941 instead of 75 per cent.

1943

Jan. 5—Amendment to L-180: Quotas for production of replacement storage batteries in 1943 were set at 22½ per cent total 1941 for the first quarter, 22½ per cent for the second quarter, 30 per cent for the third quarter and 25 per cent for the fourth quarter. Inventory limit of replacement batteries was increased to a 90-day supply based on 1941 sales.

Jan. 26—Amendment to L-158: Manufacturers were permitted to deliver **REPLACEMENT PARTS** without regard to orders bearing preference of AA-3 or lower. Purchase orders of the armed services of the government were invalid unless bearing a preference of AA-1 or higher.

March 11—Amendment to L-158: Production of **FUNCTIONAL REPLACEMENT PARTS** was changed from a percentage to an inventory basis to fit into CMP. Effective April 1, no manufacturer could produce replacement parts at such a rate that his inventory of such parts at dollar cost value at the end of any quarter of 1943 would be above his inventory as of April 1, 1943. Producers have a 60-day period at the end of each quarter to adjust their inventories to these limitations. Standardization of oversizes in pistons, piston pins, piston rings and engine bearings also were set. Turn-ins of used parts are not required for oil filters and certain truck parts designed to improve the vehicle's operating efficiency.

April 6—Limitation Order L-270: Production of 30 items of **AUTOMOTIVE MAINTENANCE EQUIPMENT**, such as battery chargers, brake-testing machines, chassis dynamometers, headlight testers, certain service and shop jacks, lifts, motor analyzers, certain hand tire-pumps and wheel balancers, is prohibited, effective April 30. Production of 42 other items, including brake riveters, hydraulic rams, piston expanders, spark-plug cleaners, toe-in gages and wrecking cranes, in any calendar quarter is limited to 20 per cent of the number of such items sold for other than original equipment in the corresponding quarter of 1941. Production of 35 items, including anti-freeze testers, brake-drum lathes, cylinder grinders, service jacks, piston grinders, valve refacers, valve-seat reamers, and compression gages, is limited to 75 per cent of the number sold for replacement in the same quarter of 1941. Dollar volume of maintenance-equipment production in any calendar quarter is limited to 10 per cent of the total dollar volume of maintenance equipment sold during the corresponding quarter of 1941. Use of copper in the manufacture of such equipment is limited to conducting current, bearings, bushings and check valves. Use of aluminum, steel and other critical materials is prohibited where less critical materials can be substituted. Sale or delivery of maintenance equipment is not allowed except on a preference rating of AA-5 or higher.

April 29—Amendment to L-270: Use of any copper in the manufacture of **AUTOMOTIVE MAINTENANCE EQUIPMENT** is prohibited where the use of less critical material is practicable.

May 20—Conservation Order M-311: **SCRAPPING OF ANY FUNCTIONAL AUTOMOTIVE REPLACEMENT PARTS** is prohibited except when such part is "no longer serviceable," effective June 1.

July 10—Amendment to L-201: In the production of **TIRE CHAINS AND PARTS FOR PASSENGER CARS** from April 1, 1943, to March 31, 1944, manufacturers are limited to 16 per cent of the total weight of metals contained in all chains and parts sold from April 1, 1941, to March 31, 1942. In the production of **TIRE CHAINS AND PARTS FOR TRUCKS** in the same period, manufacturers are limited to 24 per cent of the weight of metals contained in such parts from April 1, 1942, to March 31, 1942. Tire-chain sizes are limited to four sizes for passenger cars and eight sizes for trucks.

Heads Replacement Sales

M. G. McGregor comes in from the branch manager's post at Cincinnati to take care of replacement sales for the Ahlberg Bearing Co., Chicago. "Mac" is well known in the trade, having been associated with the company since 1925. He has had all phases of sales and service experience working very closely with jobbers.



Supplying YOUR needs is one of FEL-PRO's war jobs!

Fel-Pro's enlarged plants are operating at record capacity to help meet the tremendous industrial and military demands for sealing materials!

Our war job is three-fold. To meet military requirements. To meet industrial requirements. To meet your requirements.

The vital automotive transportation which America is depending upon you to maintain must have gaskets and sealing materials. You have a war job to do just as important as the men in the war production plant. So as long as consistent with military needs, Fel-Pro will make every effort to see that you are supplied with the necessary gaskets. This is our pledge to you.



Felt Products Mfg. Co. 1521 CARROLL AVE., CHICAGO, ILL.

★ ★ ★ ★ ★ ★ ★ ★

★ *Keep 'em Rolling* ★
★ *with FEL-PRO* ★

★ **GASKETS**—for every automotive application. ★

★ **PACKING**—for water pumps, bearing seals, etc. ★

★ **GREASE RETAINERS**—in sizes and types to fit all cars. ★

★ **TAPE**—Woven Asbestos Lining Tape — Twisted Asbestos Wicking. ★

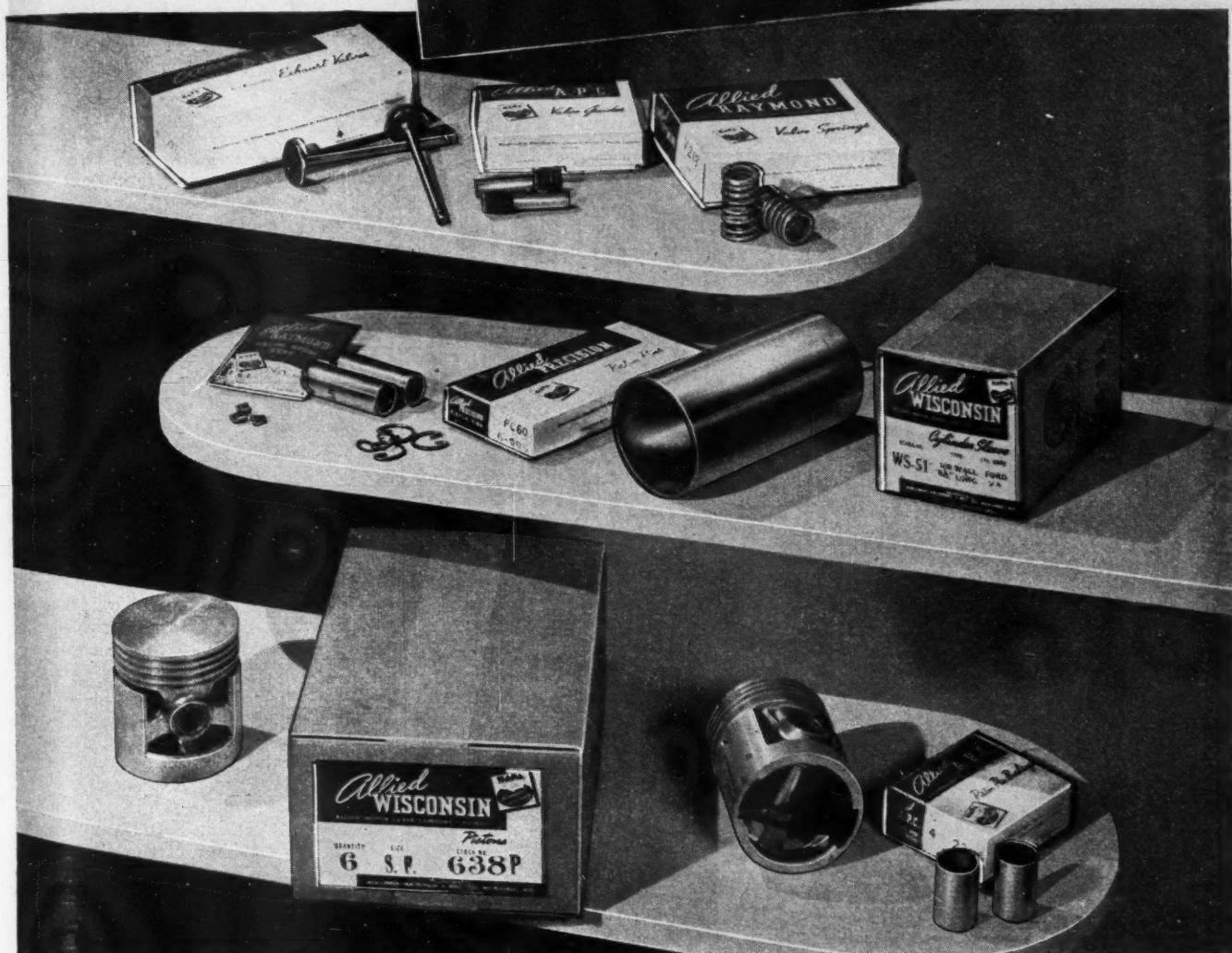
★ **MANY OTHER** Automotive Sealing Products. ★

★ *Most of these products are available packaged in boxes or sets.* ★

★ ★ ★ ★ ★ ★ ★ ★

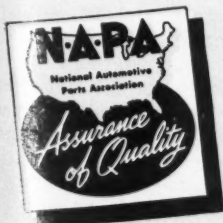
Where, except in "Allied," can you find a motor parts line whose quality is assured not only by the maker, but also by a nation-wide independent distributing organization?

Allied MOTOR PARTS



The accuracy and stamina built into Allied Motor Parts are precisely what you want for a motor reconditioning job that will set up without fuss and trouble, and give a good account of itself in service.

At every step, Allied works with you, and saves you time. The complete Allied line for cars, trucks and tractors is clearly and comprehensively cataloged. And master stocks maintained in NAPA Warehouses assure quick shipment even on rarely-needed numbers. See your NAPA jobber for Allied Motor Parts. He's a good man to know.



- ★
- Pistons
- Piston Pins
- Piston Pin Bushings
- Piston Pin Set Screws
- Piston Pin Lock Rings
- Valves
- Valve Keys
- Valve Guides
- Valve Springs
- Expansion Plugs
- Cylinder Sleeves
- Cylinder Sleeve Assemblies

ALLIED MOTOR PARTS COMPANY • DETROIT, MICH.

OCTOBER, 1943

When writing to advertisers please mention Motor Age

75

Detroit Letter

(Continued from page 58)

care, inflation and rotation of tires, attention to air cleaner, check-up of wheel alignment, lamp adjustment, adjusting or relining brakes and constant alertness to minor mechanical difficulties."

The report points out that the shortage of replacement parts already is acute. Many functional parts for models 10 years old or over no longer are being manufactured. The same situation exists to a lesser degree to

those seven years old or over. No new civilian cars have been manufactured since Feb. 10, 1942, so every car on the road is at least 1 2/3 years old. According to the ODT, adverse factors in the replacement parts situation are the concentration of travel among older cars, a larger percentage of city "stop and go" driving, neglect of relatively idle vehicles, use of low-octane gasoline and other inferior products and more wear because of poorly maintained roads.

While use of automobiles by essential war workers in going to and coming from work has increased and the



"Understand now—I don't want any shilly-shallying when you get over Essen."

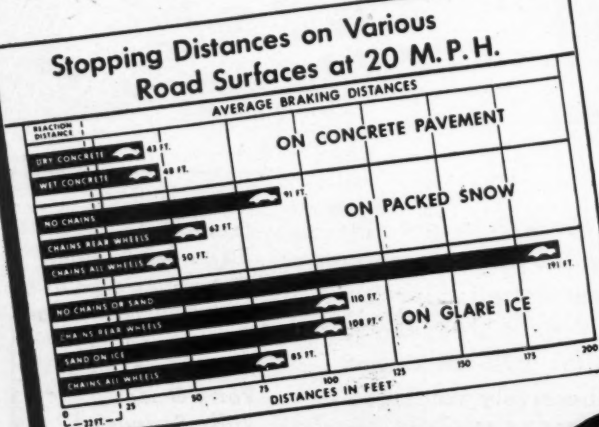
YOUR CUSTOMERS NEED CHAINS!



Tests by America's largest safety organization, NATIONAL SAFETY COUNCIL, have established beyond any doubt that "tire chains are indispensable" to safe winter driving; and that they are "the most practical means of self-help for increasing traction on snowy and icy roads." Any sane person knows it is cheaper to use chains than to pay hospital bills, repair fenders, straighten axles, or run the risk of losing an irreplaceable vehicle.

3000 TESTS PROVE IT!

Essential vehicles must be kept moving—safely, and safe winter driving means tire chains. With new chains hard to get there is a big market for chain-repair parts. The message on the left is part of a large Tire Chain Maintenance Chart offered through your Pyrene Chain jobber. He'll supply the chart and the chains and repair parts you need to keep victory's vehicles operating.



"Few can Buy
but all
can repair"

BE SURE THEY'RE...

Pyrene Manufacturing Company
NEWARK • NEW JERSEY
ATLANTA • KANSAS CITY • CHICAGO • SAN FRANCISCO



population of the state, especially industrial centers like Detroit, Flint, Muskegon and Saginaw, has grown greatly, the number of passenger-car registrations is dropping steadily. From registration of 1,544,551 passenger cars in 1941, the total has dropped to 1,371,502 on July 1, 1943, a decline of 11 per cent, or 173,049 cars. A further loss of 170,740 cars this year can be anticipated, according to ODT forecasts, while next year it is estimated that 239,036 cars will go off the road. This would reduce the state's registrations to 961,726 passenger cars, a reduction of approximately one third from the 1941 total and the lowest figure since 1933, when passenger-car registrations were 955,570.

Non-availability of mechanics complicates the repair situation. A survey of 227 dealers in Michigan, Northern Ohio and Indiana by the Manpower Division of the Automotive Council for War Production showed a loss of 42 per cent of the mechanics employed between November, 1941, and November, 1942. These dealers had to refuse 10 service customers per day during November, 1942, due to lack of manpower. The Detroit Auto Dealers Association surveyed 103 new car dealers and 34 independent garages in the Detroit area and found that the total dropped from 872 mechanics on Jan. 1, 1942 to 492 on Jan. 1, 1943, a loss of 49 per cent.

An inspection of tires on passenger cars in 13 factory and 12 municipal parking lots gave some rather startling results. Approximately 7000 tires were looked over for underinflation, irregular wear, need for recapping and need for repair by experienced tire inspectors. Half the tires inspected were deficient in some respect. Fifteen and a half per cent were underinflated, 14 1/2 per cent were wearing irregularly, 17 1/2 per cent were worn to the point of being unsafe.

(Continued on page 78)

Detroit Letter

(Continued from page 76)

cent needed recapping and 2½ per cent needed repairs. Applying these percentages to the 6,857,510 tires on the state's passenger cars, on the basis of five tires per car, there are 1,200,064 tires that need recapping and 171,438 that need immediate repair. If Michigan were given its proportionate share of the 5,000,000 new synthetic and 7,000,000 pre-Pearl Harbor tires to be made available before Jan. 1, 1944, this would be only

400,000 tires. That would leave almost 1,000,000 tires needing to be recapped in the last six months of 1943. It would be necessary for all recappers to retread 7710 tires per day six days per week, operating at a steady rate and with enough manpower and camelback available. This could be done if conditions were favorable, according to the report.

Ride sharing and low operating speeds are other essentials in car conservation along with tires. From a pre-war average of 1.7 occupants per car, the campaign for ride swapping has boosted the state-wide average to

2.148 persons per car. Best records were made by war workers' cars, where ride sharing has been particularly emphasized through factory campaigns and gasoline rationing. The general factory average is 2.28 occupants per car and the Detroit factory average is 2.05 per car. This compares with a general city average of 1.93 persons per car and a general rural average of 2.148 per car.

Average speed of passenger cars on Michigan highways has dropped from a pre-war average of 49.7 m.p.h. to an average of 40.1 m.p.h. in May, 1943. Low point was achieved in October, 1942, when it fell to 35.5 m.p.h. as the national 35 m.p.h. speed limit took effect. Since then it has gradually risen. The commercial-vehicle average speed hit a high of 41.7 m.p.h. in May, 1942. It declined to 33.9 m.p.h. in October and November, 1942, then gradually increased to 37.1 m.p.h. in May, 1943.

A study of fatal highway accidents involving 658 vehicles in 1942 showed that 38.4 per cent were damaged to the extent of \$500 or more, resulting in lost transportation. Applying the average to all similar accidents, it is estimated that 592 vehicles were thus wrecked in 1942. In addition, there were 99,000 other accidents requiring vehicle repairs.

Rationed Service

(Continued from page 48)

if their automotive needs did not tie in closely with the war effort, they could not be turned down cold. Then there was the group of owners in the area that was not in the habit of patronizing the shop but under present circumstances had no other shop to supply its needs. And finally there were the transients, the summer residents and those driving through to other seashore resorts.

Finally, a schedule of rationing was worked out. Trucks would receive 60 per cent of available shop time, old customers and other local passenger-car owners would receive 30 per cent and finally transients would receive 10 per cent.

Jobs are taken in this order of preference. A passenger-car owner must wait if trucks have the shop tied up. Transients must wait if old customers have trucks or passenger cars in the shop.

And Lakehurst Motors have curtailed certain services. The shop will not wash or polish a transient's car or straighten its fenders.

Neither of the proprietors claims that the rationing system is perfect. All they say is that it works. Evidence of that fact is the present bustle of the shop and the esteem in which it is held in Toms River and over a good section of Ocean County, of which Toms River is the county seat.



The CANNING SEASON has just begun

It started with a pickle-puss named Mussolini, who has a couple of buddies named Adolf and Hideki. Their numbers are up, too, and a lot of busy plants like Arrow are going to be on hand to yell "Bingo." That will be a great day for the decent members of the human race.

SEALED-BEAM
HEADLAMPS
FOG LAMPS
MARKER LIGHTS
SAFETY FLARES
SIDEVIEW MIRRORS
REFLEX REFLECTORS
DIRECTIONAL SIGNALS
PARKING LIGHTS
STOP LIGHTS
TAIL LAMPS
DOME LIGHTS



ARROW

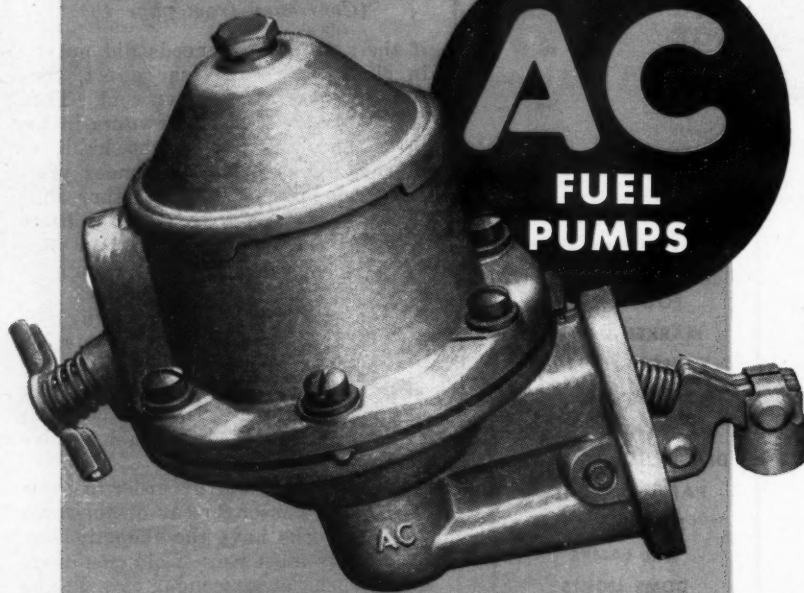
SAFETY DEVICE CO.

MT. HOLLY, N. J.

When writing to advertisers please mention Motor Age

MOTOR AGE

Protect YOUR FUEL PUMP BUSINESS



AC
FUEL
PUMPS

AVAILABLE THROUGH ALL
AC WHOLESALERS

**BUY WAR BONDS
FOR VICTORY**

Use as original equipment is a big factor in developing, *and maintaining*, the quality of AC Fuel Pumps. The exacting demands of car and truck engineers assure that pumps adequately meet the requirements of their engines.

AC PUMPS ASSURE—

the careful control of pressure and flow which is required for a satisfactory supply of fuel to the engine. In AC pumps, you get the hardening and precision machining of certain vital parts which are necessary to long life. And with AC pumps and parts you can be sure of these essential features of protection for your workmanship and reputation—

- ✓ Accurate control of spring tensions and temper.
- ✓ 4-layer, patented-impregnation, diaphragms of special airplane cloth.
- ✓ High, and controlled, pin hardness.
- ✓ Carefully finished rocker arm pads, accurately placed to center on cam.
- ✓ Split-hair control of rocker arm clearance and pad hardness.
- ✓ Uniform pull rod hardness at pin holes.

PROTECTION FOR YOUR CUSTOMERS

Replace with new or rebuilt AC Pumps, and repair with AC Parts and AC Diaphragm Kits. In that way, you *know* that you give your customers the "new pump" long life, reliability, and proved efficiency which car, truck, and bus engineers demand for original equipment.

SERVICE HELP FROM AC

Trained AC Field Service Engineers are working with dealers to help them give better service and conserve AC products. Part of their job is to give dealers the new AC Shop Manuals, one of which covers Fuel Pumps. If the engineer hasn't brought yours yet, he will soon. In the meantime, if you'd like them quicker, send in the coupon.

Field Service Department, AC Spark Plug Division
910 Union Industrial Building, Flint, 3, Michigan

MA-10

Gentlemen: Please send at once, no charge, the AC Shop

Manuals checked:

- | | |
|--|--|
| <input type="checkbox"/> How to Service Spark Plugs | <input type="checkbox"/> HOW TO SERVICE FUEL PUMPS |
| <input type="checkbox"/> How to Service Spark Plug Cleaner | <input type="checkbox"/> How to Service Air Cleaners |
| <input type="checkbox"/> How to Service Oil Filters | <input type="checkbox"/> How to Service Speedometers |
| <input type="checkbox"/> How to Service Ammeters and other Instruments | |

NAME _____

FIRM _____

STREET ADDRESS _____

CITY _____

STATE _____

WAGNER LOCKHEED No. 21 HYDRAULIC BRAKE FLUID

is the *only* fluid on the market
having all these features and advantages

- 1 One mixture for *all* seasons . . . Reduces inventory.
- 2 One mixture for *all* cars and trucks . . . Reduces inventory.
- 3 Assures year-round operating performance.
- 4 Functions in sub-zero temperatures.
- 5 Amply lubricates the system over the operating range of temperature.
- 6 Maintains chemical characteristics after long use.
- 7 Maintains its high operating temperature characteristics.
- 8 Mixes with other approved fluids.
- 9 A proven product . . . Used by car manufacturers.
- 10 Nationally advertised . . . Has consumer acceptance.
- 11 Warehoused throughout the United States and Canada at 25 Wagner branches.
- 12 Packaged in containers easily identified by the well-known Wagner red, white, and blue color combination.
- 13 A product of Wagner Electric Corporation, manufacturers of Lockheed Hydraulic Brakes.
- 14 Available everywhere through leading jobbers.



Whatever the size or shape of the container, Wagner No. 21 will be readily recognized by the familiar red, white, and blue design with No. 21 in the circle.

Whenever brakes need to be repaired, you'll get parts of the highest quality by specifying Wagner Lockheed



There is a Wagner jobber near you who can supply Wagner Lockheed Brake Fluid. He can also supply Wagner Lockheed Hydraulic Brake Parts for repairing brakes on all makes of cars and trucks. If you don't know his name, please write us today.

H43-17

WAGNER
Automotive Products Include:
LOCKHEED
HYDRAULIC BRAKE FLUID
•
LOCKHEED
HYDRAULIC BRAKE PARTS
•
CoMaX
BRAKE LINING
•
WAGNER
AIR BRAKES
•
TACHOGRAPH

Wagner Electric Corporation

ESTABLISHED 1891

6498 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
AUTOMOTIVE AND ELECTRICAL PRODUCTS

For Victory — Buy U. S. War Bonds and Stamps

Parts Industries in War

(Continued from page 33)

duced include gears, oil coolers, radiators, transmissions and pumps. In addition, a complete amphibian tractor for the Navy is being manufactured at one of the company's plants. Other war products are aircraft gun-turrets, supercharger clutches, shell cases, anti-aircraft gun-mounts, marine gun turrets, reverse gears for landing barges and tank-landing craft, and armor plate. Pumps of all types for aircraft, tank and marine

use are made in one plant which specializes in that equipment.

Radiator manufacturers had to design oil-coolant systems for aircraft that would function at 125 degrees in desert heat and at 65 degrees below zero at high altitude or in Arctic climate. One former maker of automobile radiators is now fabricating tubular radiators, submarine air-coolers, oil and water coolers for Diesel engines, aircraft-engine air inter-coolers, oil coolers for tanks, and amphibian-tractor radiators.

Company engineers redesigned the radiator for a liquid-cooled aircraft engine. The old design consisted of

9,112 extruded copper tubes in two welded casings, requiring 12 fittings. The new simplified design is composed of 816 flat tubes, with the sheet fins bake-soldered in a single package, and only four fittings. The new design is 56 lb. lighter when filled, a paramount factor in aircraft, and it has greater endurance. A supercharger inter-cooler for one fighter plane also was successfully redesigned with a resultant great saving in weight.

Another manufacturer of radiators for 38 years has become the chief production source of steel helmets for the U. S. armed forces, turning out millions of these protective headgear since the first one was delivered Feb. 4, 1941, 10 months before Pearl Harbor. The present U. S. helmet is made of manganese steel, has a maximum weight of 3 lb. and must withstand a .45-caliber bullet at point-blank range. Besides helmets, this company also is making aircraft radiators and inter-coolers, half the gaskets used by the Army, power-linking machines for ammunition, projectiles, flame dampeners for aircraft and marine engines, and closures for Army gasoline and water cans for field service.

One of the outstanding cooperative industrial efforts of this war is that participated in by a group of automotive-spring and bumper companies in the production of armor plate. This was initiated by a company which had been selling springs and bumpers to the automobile industry for 29 years. In 1941, this company's engineers began casting about for a war product to fit their facilities. They finally decided upon armor plate. When one of the company's former automotive customers was tooling up to make light tanks, it needed an armor-plate supplier. So a contract was signed. Later other tank builders needed armor plate, so the leading company formed a pool of 15 other companies, most of them manufacturers of springs and bumpers. Some cut, heat-treated and drilled the plate and others sand-blasted it and ground the edges.

A volume peacetime producer of shock absorbers and generators is now 100 per cent in war production with a wide variety of products. Diesel generators weighing up to 2,400 lb. are made for sub-chasers and PT boats. Booster fuel-pump motors for high-altitude bombers were in production as early as November, 1939. Bomber landing-gear assemblies, with built-in telescoping hydraulic shock absorbers for three types of bombers took up an entire plant that had been built for automotive-generator output. Other items included precision shafts and gears for liquid-cooled engines, bomb-tail fuses for 2,000 lb. block busters, tank-tread parts, 20 and 37-mm. shells, hydraulic devices for a Navy fighter plane and such familiar products as shock absorbers for gun carriers, tank destroyers and Army

(Continued on page 82)

THE EVER POPULAR PAIR HANSEN

AUTOMOTIVE AIR HOSE COUPLINGS and HOSE CLAMPS 1000 SERIES



For twenty years Hansen automotive couplings have been the leaders in the field, not only because of their efficiency and ease of operation but also because of their air "savings" and longer life. Especially adapted for garages and filling stations. Small, compact and rugged they will take plenty of rough usage and are absolutely leakproof. They are easily attached and detached and have a complete swivel action, preventing kinking of hose and excessive wear.

Hansen hose clamps are easy to install requiring no special tools, have two grips instead of one, inside and outside of hose. Safe working pressure of 500 pounds. Economical, can be used many times over. Neat, trim and tailored. Send for free Automotive Catalog.

Hansen mfg co.

★ INDUSTRIAL AIR LINE EQUIPMENT
1786 EAST 27th ST. • CLEVELAND, OHIO



BATTERIES ARE PRECIOUS NOW ★ REGULAR INSPECTION

AND FREQUENT RECHARGING WILL LENGTHEN THEIR LIFE, PRESERVE THEIR

POWER, PREVENT STARTING TROUBLE AND GUARD YOUR CUSTOMERS

GLOBE SPINNING POWER BATTERIES



GLOBE-UNION INC., Milwaukee

ATLANTA • BOSTON • CINCINNATI • DALLAS • LOS ANGELES • MEMPHIS • PHILADELPHIA • SEATTLE • KANSAS CITY • MINNEAPOLIS • PITTSBURGH

Parts Industries in War

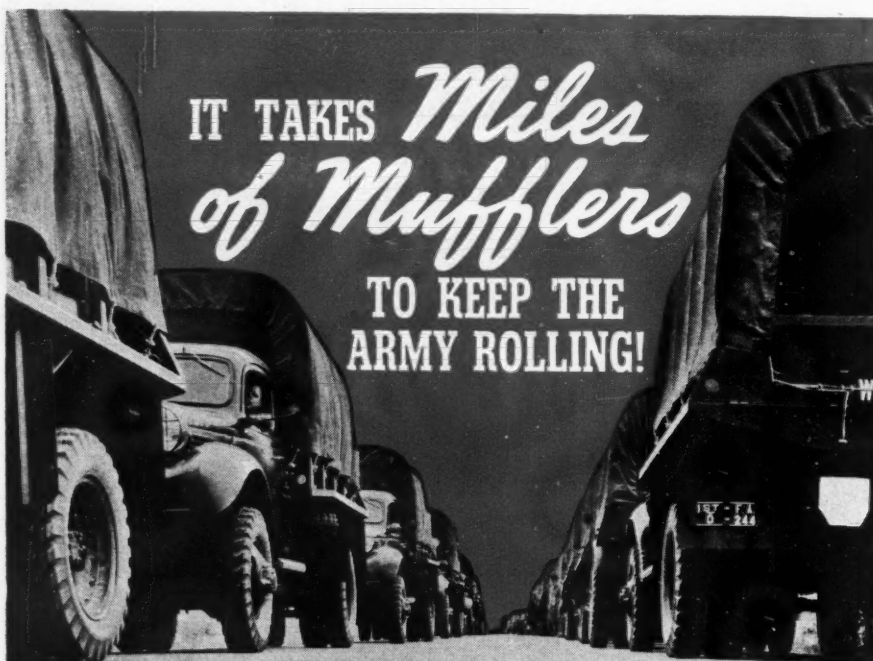
(Continued from page 80)

trucks. Other former spring and shock absorber companies are making gun recoil-mechanisms, projectile casings, aircraft hydraulic devices, volute springs for tanks and trench-mortar shells.

One of the major expansion jobs of the war has been achieved by a company that has been 34 years in the spark-plug business, as well as a long-time producer of oil filters and automobile instruments. This company manufactures 459 complete war prod-

ucts for which it makes 6,000 parts. It is now one of the largest producers of aircraft plugs and it was the first to go into production of plugs having ceramic insulators instead of mica. Early cost of an aircraft spark plug was \$3 or \$4 but mass-output methods have cut it to less than \$1.

Air-intake silencers are made for submarines and tanks while oil filters for tanks and military trucks are volume products, a medium tank taking a battery of four oil filters. An electric fuel pump has been developed that maintains flow under pressure instead of suction from the gas tank to the carburetor, permitting opera-



IT TAKES Miles of Mufflers TO KEEP THE ARMY ROLLING!

CUT DOWN B.P. WITH (BACK PRESSURE)

AP

● Today AP and Subsidiary make more mufflers than ever before—but the needs of our armed forces are taking part of our civilian supply. Though sorry when we must disappoint our good customers through delays or limited shipments... we're glad to be Americans doing what we can to smash the Axis! The AP Parts Corporation, Toledo, Ohio.

MILEAGE GETTING MUFFLERS

—U. S. Army Photo



"I don't know about this new mechanic, Boss."

tion under humid tropical conditions.

Its experience in precision instruments for automobiles enabled the company to convert to wartime instrument panels for tanks and invasion barges as well as certain aircraft instruments, such as tachometers, oil-pressure gages, ammeters and oil-temperature gages.

The lamp division of an important automotive parts and equipment company was among the pioneers in developing steel cartridge cases that could be substituted for brass, with a consequent saving in critically short copper and zinc. Relying upon automotive experience in the deep-drawing of cold steel, company engineers finally were able to develop a shell case that would meet the exacting requirements of Army ordnance officers.

Another of the company's plants, formerly making rubber grommets, gaskets, door bumpers, and similar small parts for motor vehicles, is now utilizing plastics, made by injection molding, for the same parts, with a large saving in rubber. Other plastic war goods from this plant include bomb and shell noses, aircraft instrument cases, firing pins, and airplane instrument panels, with a resultant saving in metals. Other war products of the company are aircraft spark plugs and batteries, fire-control apparatus, armor plate, automatic pilots, auto-gyro compasses, tracer shells, mess kits, generators and gun-firing solenoids.

Most of the automotive lamp companies are producing blackout lighting systems for military vehicles. In regular headlamp reflectors for military vehicles, stainless steel, coated with black enamel, has been substituted for brass plated with nickel. In addition, one lamp plant is making spinner shells for airplane noses and aircraft cylinder-sleeves. Shell cases

(Continued on page 85)

"THIS DEMONSTRATION SOLD US!..."



Texaco *Marfak* lubricant is exceptionally cohesive and adhesive. That's why it sticks to its job and gives maximum lubrication protection.

Under a rotating load, as in a bearing under pressure, Texaco *Marfak* supplies a constant film of lubrication. The undisturbed *Marfak* acts as a seal or "protective collar".

Now...we ask for MARFAK

Most car owners would never expect to see a chassis lubricant demonstrated. But with Marfak it is easy and simple and so effective it's a sure-fire way to sell 'em—and keep 'em sold!

Today, of course, car owners want to know what goes in and on their cars—to make them last longer. They read about Marfak in the magazine ads, hear about it on the Texaco Star Theatre radio show and from their friends. They find that Marfak is the special chassis lubricant that sticks to its job — that

resists wear-out, wash-out and squeeze-out.

Dealers everywhere are finding out more about Marfak, too. They're proving that they can build up healthy lube businesses with it. So have a Texaco man show you how easy it is to demonstrate Marfak and how it can boost your lube profits.

★ ★ ★

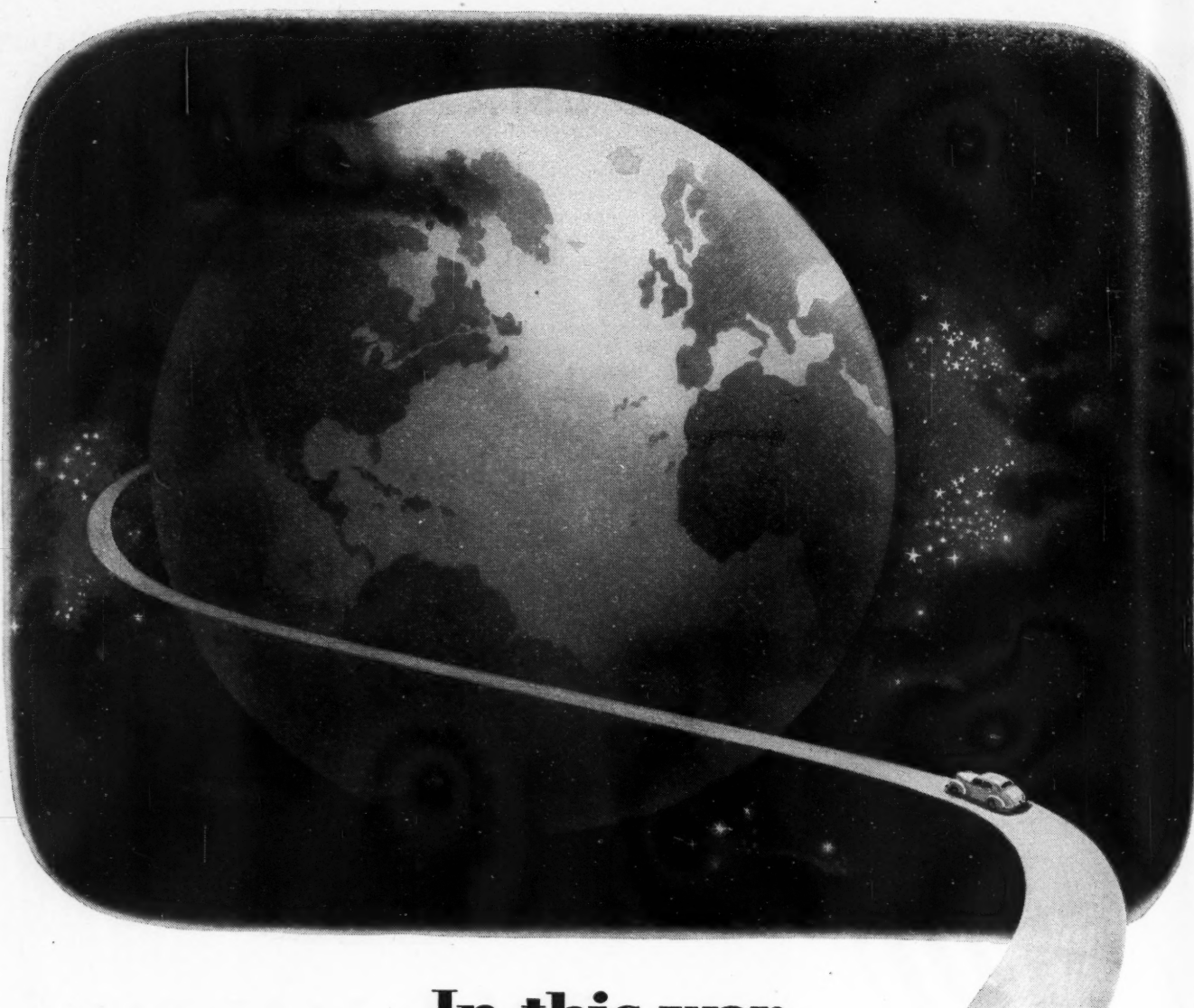
Talk to your Texaco man, phone the nearest of 2300 wholesale distributing points or write

*The Texas Company,
135 East 42nd Street,
New York 17, N. Y.*



YOU CAN MAKE MORE

MONEY WITH MARFAK



In this war Studebaker again helps to write transportation history

IN wars and in peace, for over 91 years, Studebaker vehicles have been continuously writing their share of history on the roadways of the world.

And in this war, it's not only on the ground, but also in the air, that Studebaker is establishing new records of transportation accomplishment.

More and still more of the mighty Boeing Flying Fortresses are powered by Wright Cyclone engines that Studebaker craftsmen build.

Studebaker progressiveness has made the organization one of the automotive industry's largest producers of aircraft engines for war purposes—as well as a leader in the manufacture of big multiple-drive military trucks. And the great Studebaker factories are also turning out much other war matériel needed for victory.

Every Studebaker owner, every Studebaker dealer, may well thrill with pride in the extent and the consequence of Studebaker's war pro-

duction assignments. And you may be sure that the public will long remember the part that the Studebaker organization is being privileged to play in hastening victory.

Many motor car dealers are fully aware of the new importance the Studebaker franchise will have in the days of peace to come.

Every hour of every day, Studebaker's war production accomplishments are adding new luster to Studebaker's great reputation.

STUDEBAKER

Pioneer and pacemaker in automotive progress

Parts Industries in War

(Continued from page 82)

also are made by the extrusion process in 37, 90 and 105-mm. sizes.

Manufacturers of brakes and brake linings are now making the same items for jeeps, tanks and combat vehicles. One brake-lining company is using looms formerly devoted to automobile carpeting to weave duck for the Army. Other war products of this group include fiber bearings for naval ships, anti-tank mine fuses, parachute harness, shell boosters and suction and water hose for the Navy.

A large processor of automotive upholstery became within six months the biggest producer of parachutes. Company engineers developed special parachute-making machinery later adopted by other parachute makers, eliminating more than 20 hand operations. Other of this company's seven plants also are engaged in war production, making truck tarpaulins, tents, jungle hammocks, aircraft fuselage insulation, and water-repellent foul-weather clothing for the Navy. A manufacturer of automotive upholstery is making wool uniforms and overcoats.

The tire and rubber companies also are contributing heavily to the war effort, not only manufacturing rubber products for war but also making aircraft, gun carriages, tank cannon and airplane auxiliary fuel tanks. They are playing a leading part, too, in the management of synthetic-rubber factories, and several are operating shell-loading plants for the government.

Barrage balloons are produced by the tire and rubber industry, as are self-inflating life rafts. Rubber pontoons for portable bridges that must be capable of supporting tanks and armored vehicles also are manufactured. Gas masks, de-icers for airplane wings and propellers and life belts also are on the list.

Outside the field of rubber, one company makes bomber wings, miscellaneous air-frame parts, airship cabins and complete Navy fighter planes. Fabric for the blimp bags also is made by the company. Another company is making wing sections for huge war-born transport planes. This company also makes the gun carriages for 40-mm. anti-aircraft guns. Shatter-proof oxygen tanks for high-altitude planes also are produced.

The petroleum industry has been called upon to supply greatly increased military needs for aviation gasoline, fuel oil for naval vessels, gasoline and lubricants for combat vehicles and military trucks. Production of aviation gasoline to supply the ever-increasing demands of the Army Air Forces operating all over the globe is one of the biggest jobs assigned the petroleum industry. There ultimately will be 126 refineries producing millions of gallons of 100-octane gasoline daily. Military planes are able to get about one-third more power out of 100-octane gasoline than the previous 87-octane variety, as well as increase their rate of climb by 25 per cent and add 25 to 35 mph. to top speed.

Fuel oil for naval vessels of the battleship class down to mine-sweepers is being supplied by the industry, along with Diesel fuel for submarines and landing craft. Toluene for TNT in explosives also is derived from oil refineries, as are butadiene and styrene used in the manufacture of synthetic rubber. And to meet these expanding needs, the petroleum companies have used all the available equipment possible, salvaging and reconditioning valves, fittings, compressors and pumps so as to relieve the necessity of using critical materials and manufacturing facilities for new parts.

Automotive accessory companies also are contributing their skill and experience to the improvement of armaments. One company is making rear-view mirrors for jeeps. Another is furnishing glare shields for aircraft cabins. Still another is making air horns for PT boats and air compressors for bomber control-systems.

(Continued on page 86)

NIEHOFF

Serves



THE REPAIRMAN
through a national network of NIEHOFF Jobbers with a complete line of NIEHOFF Approved Quality Products that speed up and improve ignition service.



THE CAR OWNER
by enabling him to maintain his car for essential driving, and to protect his investment in transportation.



THE NATION
by keeping essential passenger cars, trucks and tractors service-worthy on the home front, to conserve man hours, and speed the Victory.

Ask your Jobber for NIEHOFF Ignition Parts, Starter and Generator Brushes, Magneto Parts and Hydraulic Brake Parts.

BACK THE INVASION—BUY WAR BONDS

C. E. NIEHOFF & CO.
4925 Lawrence Ave., Chicago 30, Ill.
Branch Office: 1342 S. Flower St.
Los Angeles, California





APPROVED QUALITY PRODUCTS

NIEHOFF

Parts Industries in War

(Continued from page 85)

A specialist in windshield wipers is fabricating these devices for windshields and bombardier's windows of military planes. And a manufacturer of automotive polishes is turning out parachute flares.

The manufacturers of automotive maintenance and repair equipment and hand tools have an important role in the war program, receiving \$500,000,000 in orders from the Ordnance Dept. alone in 1942. In addition they

are providing tools and equipment for maintenance of the huge U. S. air forces and for the U. S. Navy. Every motor vehicle carries at least 20-on-vehicle tools, while a tank requires 150. Then there are the requirements of first and second echelon field maintenance and the completely equipped shops of the third and fourth echelons. The latter must be ready to do a complete rebuilding job on a truck or engine. Brake-relining machines, jacks, hones, realignment apparatus, lubrication equipment, axle straighteners, caster, camber and toe-in gages and wrecking cranes are only a few

of the items that must be supplied.

The maintenance and equipment industry has demonstrated initiative and ingenuity in meeting these huge government demands.

On top of this impressive output of munitions, the automotive parts industry is carrying the added load of supplying replacement parts for the nation's 30,000,000 motor vehicles. R. L. Vaniman, who runs this phase of the home front as director of the Automotive Division of the WPB, estimates that \$400,000,000 worth of new parts for essential civilian motor transportation will be produced this year.

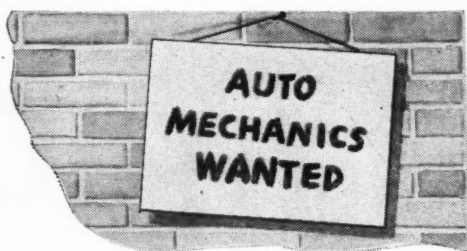
Another job which the parts companies have undertaken, in cooperation with the automobile manufacturers, is the extensive research that has been necessary in adapting alternate materials for many replacement parts.

NE (national emergency) steels have been used successfully in transmissions, axles, gears, steering gears and certain types of bearings. In some cases, the alternate alloy steels have proved better than the metals which they displaced, as in the case of one company that developed new-type steels for axle shafts and final-drive gears that outlasted the original steels in ruggedness and length of life.

The amount of chrome-nickel steels in exhaust valves has been greatly reduced by going to a two-piece welded-head type and reducing the chrome and nickel content. Lead-base babbitts have replaced tin in many bearings while steel-backed bushings have succeeded the bronze variety. The amount of copper in radiators has been reduced appreciably by substituting steel in the fins. Cast-iron carburetor and fuel-pump bodies have replaced zinc die-castings, along with many of the parts. Plastic fuel-pump bodies also have been developed satisfactorily.

Soft carbon-steel, synthetic-rubber, and fiber-compound gaskets have been substituted for the copper and cork variety. Lamp reflectors are now made from drawn steel instead of bronze. Steel tubing has replaced copper or rubber in certain cooling and hydraulic-system connections. Reclaimed rubber has been substituted for natural rubber in radiator hose and fan belts. Some stainless steel has replaced copper in ignition wiring but generally copper has been retained if possible. The amount of tungsten in distributor points has been reduced to the safest minimum.

In Nazi Germany they have been reduced to the necessity of rationing the use of horse-drawn vehicles, so desperate is the need for transportation. In this country, thanks to the ingenuity and mass production talents of the automotive parts industry, motor vehicles still are rolling on the highways to carry out the multitude of essential uses to which they are put by their owners.



A Sign of the Times THAT POINTS TO K-D



870 Piston Ring Filer, for correctly filing rings to proper fit. 380 Valve Spring Compressor for all valve-in-heads and most L-heads. 600 a versatile and popular Valve Spring Lifter for L-head motors. 605 Keeper Inserter installs split keepers. 245 Bar-type Valve Lifter for Fords. These are only a few of nearly 60 speedy K-D Tools.

When your shop is "swamped" with work and you wish you had a couple more mechanics, that's the time to think of K-D Tools. They're built by men who know what your tough jobs are and how to make 'em easy. They've got speed designed into every rivet of 'em.

K-D Tools are working for Uncle Sam, it's true, and he gets first call. But there are thousands of cars and trucks to keep running here at home if we're to win this war. You can get the K-D Tools you need for these essential repairs.

Go to your Jobber, he probably has the numbers you need, right there in stock or can get them for you. Write to us for a complete catalog, if you don't have one: K-D Manufacturing Co., Lancaster, Pa., or Hamilton, Ontario.

K-D TOOLS
The Hustlers for Your Toolbox!

AC OIL FILTERS

Conserve MORE THAN JUST OIL

Oil filters are *musts* with the armed forces. "Conservation" is the reason—conservation of oil and gas, bearing surfaces, critical engine parts.

Conservation FOR YOUR CUSTOMERS

Your car, truck, bus, and tractor customers get the *same protection* from the AC Oil Filter products you supply. And, within the limitations of rationing, you have a *full line* with AC—complete filters, replacement elements, and installation kits.

Conservation FOR YOUR BUSINESS

When you service and supply AC Oil Fil-

ter products, you do two big things:

1. You help your customer to conserve his vital transportation, and hold down his operating cost. That makes, and keeps, him a friend.
2. You help to keep your business going. That, too, is essential.

AC OFFERS THIS HELP—

Oil Test Pads—Use them to wipe the dip stick. A dirty spot means dirt in the oil. That calls for an oil change and filter installation or element replacement.

Field Engineering Service—Trained AC men are working with dealers to help them give better service and conserve AC products. If the engineer in your territory hasn't brought your AC Shop Manual yet, he will soon. In the meantime, if you want a set, send in the coupon below. Please check which manuals you wish.

Constant Product Improvement—Like all other AC products, AC Oil Filters are constantly being improved through continual contact with the engineering staffs of engine manufacturers; and, now, also through the co-operation of technicians of the armed services with AC factory engineers.

It is now time to start getting ready for the post-war market. Get your stocks in good shape and begin building customer contacts.



**WAR
BONDS
YOUR BEST
INVESTMENT**

AVAILABLE FROM ALL AC WHOLESALERS

Field Service Department, AC Spark Plug Division
910 Union Industrial Building, Flint, 3, Michigan

Gentlemen: Please send me at once, no charge, the
AC Shop Manuals checked.

- | | |
|--|--|
| <input type="checkbox"/> How to Service Spark Plugs | <input type="checkbox"/> How to Service Fuel Pumps |
| <input type="checkbox"/> How to Service Spark Plug Cleaner | <input type="checkbox"/> How to Service Air Cleaners |
| <input type="checkbox"/> HOW TO SERVICE OIL FILTERS | <input type="checkbox"/> How to Service Speedometers |
| <input type="checkbox"/> How to Service Ammeters and other Instruments | |

NAME _____

FIRM _____

STREET ADDRESS _____

STATE _____

CITY _____

MA-10

Legally Speaking

A lawyer's interpretation of federal and local court decisions of interest to repairmen, presented each month

By C. R. ROSENBERG, JR.

What Is a Partner?

Two men operating a business together are not necessarily partners. If a creditor swoops down on the business, it may become highly im-

portant to determine just what their relationship is.

"The indispensable constituent of a partnership," said the Supreme Court of Vermont recently, "is that the parties shall be jointly interested in

the profits and affected by the losses of the business. Such joint interest may result even though one party furnishes the capital or stock and the other contributes his labor and skill."

But a person who receives a stipulated percentage of the profits as his pay for services in the business is *not* a partner.

"There is a clear distinction," continues the court, "between partnership agreements and agreements which give to a person not a specific interest in the business or profits but a stipulated proportion of the proceeds as compensation for his labor and services."

The latter are contracts of employment. Incidentally, a partner, ordinarily, is *not* entitled to any pay for his services. All he gets is his share of the profits, and his weekly or monthly "draw" is usually chargeable to his share of the profits. Of course, that may be changed by agreements among the partners. (*Sheldon vs. Little*, 15 *Atlantic Reporter*, second series, 574.)

Suspicion of Fraud Not Enough

A repairman who finds he has been defrauded naturally wants to do something about it at once. He'll do well, however, to make no accusations and take no action until he has convincing proof of the fraud in his hands, for the legal presumption is that there was no fraud, and that presumption must be overcome by proof.

As a California court said in a recent case:

"The rule that proof of fraud cannot rest upon mere suspicion or conjecture was well stated in an earlier decision in which it was said that the presumption is always against fraud, a presumption approximating in strength to that of innocence in crime." (*Trousdell vs. Equitable*, 130 *Pacific Reporter*, second series, 173). ad rulings

Safe Tools for Worker

That an employer may be legally and financially liable for injuries sustained by an employee as a result of defects in tools furnished him by the employer is emphasized in a recent Iowa case. There an employee who suffered severe burns sued his employer, alleging that the burns resulted from a defective device with which the employer required him to work.

Explaining the law on the subject, the Supreme Court of Iowa said:

"An employer must exercise reasonable care to furnish his employee safe and suitable tools and appliances for his work. This duty is similar to the employer's obligation to furnish

(Continued on page 90)



**KEEP UP
THE PRESSURE**

We have stopped the enemy advance. We supplied the necessary pressure. More pressure is needed to win a decisive Victory. Keep working. Buy War Bonds.

After Victory, you can again buy pressure—a Kellogg-American air compressor to serve you 24 hours per day, reducing your costs. A Kellogg-American is silent—but speaks volumes in added profits.

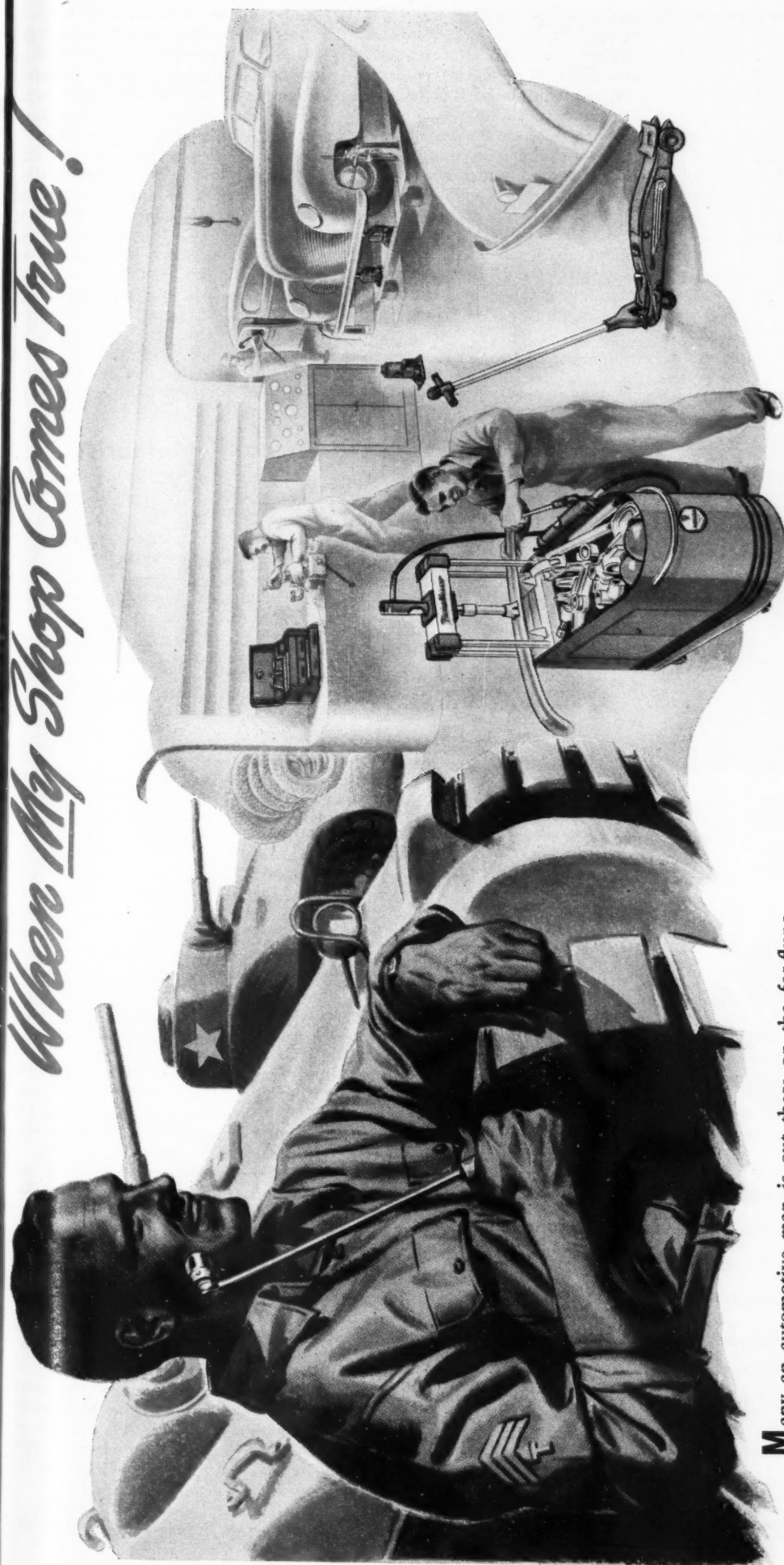


Kellogg-American
REG. U. S. PAT. OFF.

ANOTHER
AMERICAN
Brake Shoe
COMPANY
PRODUCT

**Kellogg Division
AMERICAN BRAKE SHOE COMPANY
Rochester 9, N. Y.**

When My Shop Comes True!



Many an automotive man is out there on the far-flung fighting fronts . . . pitching to speed the day when he will have his own shop back in the good old U. S. A.! A modern shop . . . equipped to do a real job . . . with Blackhawk Wrenches, Hydraulic Jacks and Porto-Power setting the standard of service-proved dependability and quality for all the equipment in the shop of his dreams!

BLACKHAWK MFG. COMPANY • Dept. M6103 • MILWAUKEE 1, WIS.

STILL AVAILABLE TO YOU . . .

On the home front, garages and shops have greater need than ever for Blackhawk Wrenches, Hand Jacks, Service Jacks and Porto-Power. Recognizing the importance of keeping transportation rolling, WPB has set up ways and means for you to get essential equipment. Your Blackhawk jobber may be able to deliver from his stock — or, he will be glad to help you arrange delivery of required Blackhawk equipment from factory production. Also ask him for latest wartime Blackhawk Wrench and Hydraulic Equipment Catalogs — or write us direct.

BLACKHAWK-

Legally Speaking

(Continued from page 88)

the employee a reasonably safe place to work. The employer is not an insurer of the employee's safety but he must exercise reasonable care to eliminate those dangers which are not the usual or ordinary incidents of the service when the employer has exercised ordinary care. The employee assumes the risks that naturally pertain to his work but is under no obligation to assume any risk caused by the employer's failure of duty.

"However, an employer is not obligated to furnish the latest, best and safest devices that will eliminate all possibility of danger. He is required only to furnish equipment that is reasonably safe and suitable.

"There is no duty on the employer's part to warn the employee of open and obvious dangers, matters of common knowledge or the operation of natural forces, in the performance of simple tasks. Where certain dangers naturally inhere in the kind of work the employee is doing, the employee assumes all such risks not resulting from the employer's negligence."

(Anderson vs. Scheurman, 6 Northwestern Reporter, second series, 125).

Under workmen's compensation laws and insurance policies, ordinarily an employee can collect compensation for injuries sustained in the course of his employment, regardless of whose fault it was that he was hurt. Instead of taking the compensation, he can bring a damage suit against his employer for the injuries, if he chooses to do so. In the damage suit he must prove that his injuries resulted from his employer's "negligence." An injured employee brings a damage suit against his employer when he believes he can prove his employer's negligence and can get a verdict for more money than the workmen's compensation would amount to.

Employer's Authority

When a repairman does work or makes any kind of deal on the basis of an agreement made through or with the other party's employee, he cannot enforce the agreement against the other party unless the employee actually had the authority to make it for his boss. A car-owner might say, for instance, "My houseman had no authority from me to order that work done," and the repairman might have a difficult time collecting unless he could prove that the houseman did have the authority at the time he ordered the job.

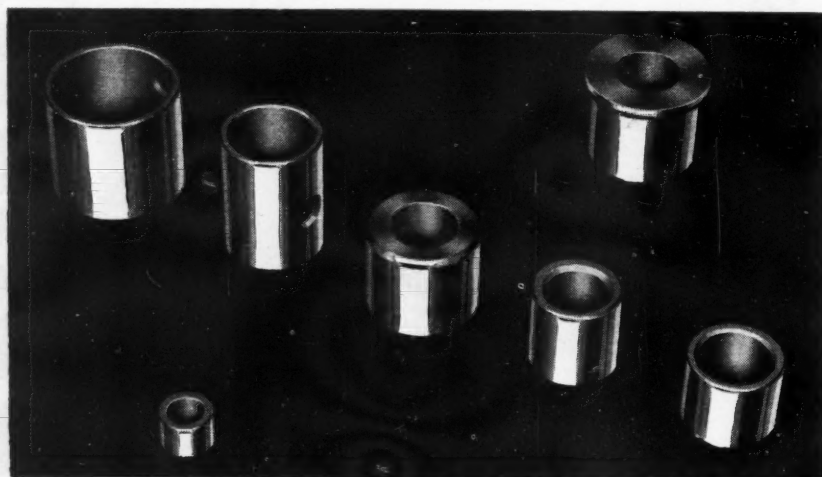
The legal rule is that, if you deal with another man's agent, representative or employee, the boss is bound by the deal only in the event that the representative or employee had authority from him to make it. More important, and perhaps more disastrous, the boss does not have to prove that his representative or employee did not have the authority: you have to prove that he did have it! So under the law, the burden is on you to inquire into the employee's authority before you make the deal.

In a recent Nebraska case a business man could have inquired into the authority of the other party's employee by making a telephone call, but did not—and the results were distasteful, to say the least.

"The possibilities of making inquiry were at hand," said the Nebraska court, "in the usual desk telephone. The complete information was available from a source clearly indicated by the known facts. The defendant failed to avail himself of this opportunity.

"One who is placed on inquiry as to an agent's or employee's authority, and who has reasonable means of making inquiry, occupies the same position in law as if he had actual knowledge of the employee's lack of authority, because he is charged with knowledge of the facts which the inquiry would have developed."

(American Surety vs. Smith, 4 Northwestern Reporter, second series, 889.)



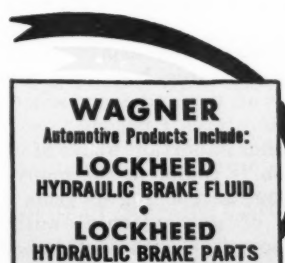
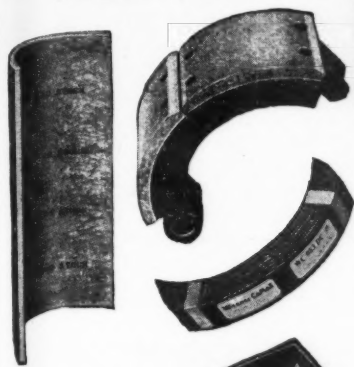
POWDER
METALLURGY
for
AUTOMOTIVE
APPLICATIONS

● This new and unusual type of bearing is now serving many important automotive applications and giving remarkable performance in each case. Excellent delivery is available on such items as Generator and Starter, Water Pump, Spindle Bolt, Clutch Pilot, Clutch Finger, and Steering Sector Bushings. Write for new descriptive literature—TODAY.

JOHNSON BRONZE
SLEEVE BEARING HEADQUARTERS
455 S. MILL STREET NEW CASTLE, PA.



It pays to install
CoMaX
 to
PROTECT
 the life of cars and trucks



WAGNER
 Automotive Products Include:
LOCKHEED
 HYDRAULIC BRAKE FLUID
 •
LOCKHEED
 HYDRAULIC BRAKE PARTS
 •
CoMaX
 BRAKE LINING
 •
WAGNER
 AIR BRAKES
 •
TACHOGRAPH



CoMaX BRAKE LINING

is unsurpassed for quick, safe, smooth stops!

War restrictions prohibiting the manufacture of new passenger cars and trucks make it more important than ever that you do your part to conserve the period of usefulness of vehicles made before Pearl Harbor.

You can help by checking brakes. Rough brake drums should be re-faced. Leaking brake cylinders should be repaired, and grease seals replaced . . . and above all if the brake lining is worn thin, best results can be obtained by relining with new, long-lived CoMaX.

CoMaX is the finest in molded brake lining. It is unsurpassed for quick, safe, smooth stops.

CoMaX is *long-lived*. This means thousands of extra miles before replacement is necessary—and less frequent replacements mean more lining immediately available for war needs.

CoMaX has reinforced backing which permits deep seating of rivets, and extends the period of safe usefulness.

Then, too, CoMaX is non-compressible, uniform in texture, easy on drums, and is age-proof . . . Available in rolls, sets, blocks and slabs.

For details, consult your nearest Wagner jobber, or write us.

B43-9

Wagner Electric Corporation

ESTABLISHED 1891

6498 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
AUTOMOTIVE AND ELECTRICAL PRODUCTS

For Victory—Buy U.S. War Bonds and Stamps

Used Car Boom

(Continued from page 47)

ables him to sell late-model cars at top prices and it helps him to hold his mechanics. With a good volume of used cars flowing through the shop, there is enough straight and overtime work to keep mechanics contented, even among the temptations offered by Chicago's booming war industries. Further, by shifting the men from used cars to customers' cars, Fitzpatrick has been able to eliminate all idle time and has been able to meet

the demand when customer's work floods in. The shop employs 15 men, five general mechanics, four body and fender men, and six utility men who divide their time among the paint, upholstery cleaning, car washing, lubricating, and polishing departments.

Two details of both used-car reconditioning and customer service save the shop a good deal of time and trouble. First, orders are placed with the parts department for needed parts and supplies as soon as a car is checked in by Ralph Smith, the service manager. This keeps the shop from becoming clogged with cars

waiting for hard-to-get parts. If it is necessary to go outside for a part, such as a fender or grille, the car is set aside until the part is available.

"Slow driving and reduced mileage have resulted in sludge conditions and valve sticking such as we have never seen before," says Smith. Consequently the shop is now using quantities of special solvents. Before checking any car, a newly bought used car or a customer's car, solvents are used to free up rings and valves.

The body refinishing department is well-manned and extremely busy, on customers' cars as well as on used cars. With only limited numbers of 1942 cars to be had, many used-car buyers want their vehicles to look as much like new as conscientious reconditioning can make them.

Fitzpatrick is conscientious, which probably is the real explanation of his success in merchandising used cars in a wartime market.

Kepner Chosen President By Hoof Products Co.

H. C. Kepner, widely known in automotive circles for many years, has been elected president of Hoof Products Co., manufacturers of engine governors and aircraft hydraulic parts, following the recent death of A. C. Hoof.

Starting with the organization in 1919 as salesman, after serving in World War I with the Marine Corps, Kepner rose to sales manager and vice president of John C. Hoof Co., assuming the same offices with the Hoof Products Co., founded in 1932.

Truck Book Popular

"Care and Maintenance of the Farm Truck in Wartime," Studebaker's latest in its series of booklets on wartime transportation subjects, has received nation-wide approval, and is now scheduled for its second printing, according to R. G. Hudson, Manager of Studebaker's Truck Division.

"An interesting aspect of the distribution of this book has been the widespread demand from schools and colleges," states Hudson.

"Another important phase of this distribution is found in the many quantity requests reaching us from a wide variety of governmental authorities and automotive organizations as well as from farm agencies, farm associations and agricultural interests of all kinds.

"A statistical break-down of distribution figures for the first six weeks of its publication shows that nearly 100,000 copies of the book are on their way to the farmer, the farm trucker and other interested groups, with the major portion of the distribution being handled by Studebaker dealers."



QUALITY IS A M-U-S-T for Dealers who THINK

New quality buying habits are being formed; and habits are hard to break, particularly those that please. That is why DEALERS WHO THINK are investing in quality products and service today.

They know that the yardstick of consumer popularity is evidenced by wartime purchases from groceries to motor oil. No one does out precious ration stamps for anything but the best.

Scarcity has focused attention on quality. Higher incomes have made possible its purchase for the first time by millions. Already they have discovered that the most economical buy is not determined by price alone. It's performance that counts!

Dealers everywhere are using sludge-resisting PennZoil to take advantage of a nation's overwhelming swing to quality. They are building today for tomorrow.

**Here's
THE WAY
TO START!**

MAIL THIS COUPON TODAY

Dept. A, The Pennzoil Co., Oil City, Pa.

Please send me, without obligation, your program to build permanent customers and profits, both now and after the war.

Name _____

Firm Name _____

Street _____

City _____ State _____

☐ Service Station ☐ Garage ☐ Car Dealer

610

De Soto

CRAFTSMANSHIP



GENERAL SHERMAN tanks made by Chrysler Corporation contain parts and assemblies made by De Soto,—made in the same shops and by many of the same craftsmen who built the good De Soto cars of peacetime. Likewise, much other fighting equipment of the Allies takes De Soto directly to the battlefronts as aircraft, artillery, and combat vehicles go into

action. Bomber fuselage sections, aircraft wing structures, parts and assemblies for the great Bofors 40 millimeter anti-aircraft cannon,—and hundreds of precision parts for the fighting vehicles of war have had their source in sound De Soto workmanship.

DE SOTO DIVISION OF CHRYSLER CORPORATION

★ ★ ★
Back the Attack — with War Bonds

Here, at home, the De Soto service sign is more than ever a symbol of courtesy and efficiency. With ample parts and skillful service, the De Soto dealers are doing a fine job for their owners today.

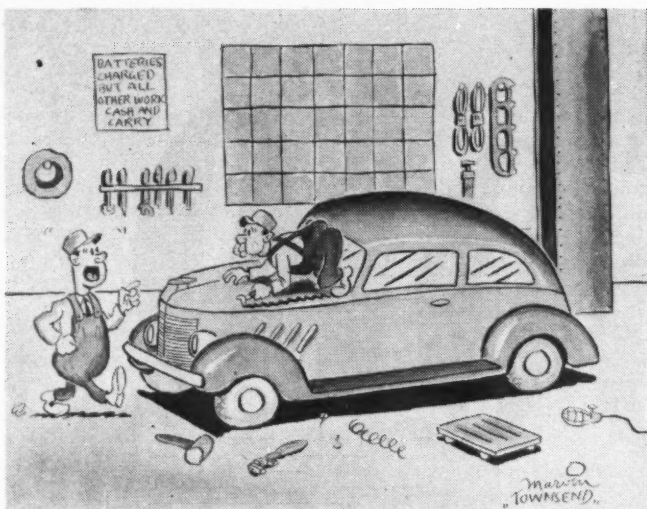


DE SOTO WAR PRODUCTION includes the precision building of airplane wing sections—bomber fuselage nose and center sections—vital assemblies for anti-aircraft guns and General Sherman Tanks—and a wide variety of special manufacturing services to a large portion of American war industry.

TUNE IN ON MAJOR BOWES, EVERY THURSDAY, 9:00 TO 9:30 P. M., EASTERN WAR TIME

OCTOBER, 1943

When writing to advertisers please mention Motor Age



"No, no, Smith! Not with a can opener!"

New Lube Needs

(Continued from page 49)

All owners should be kept aware of the dangers of sludge and varnish formation. One of the first noticeable symptoms of a dangerous condition is often a mysterious drop in oil pressure. This arises from clogged lines and filters and is a condition for which both owners and shops ought to be constantly on the alert. In other instances, sticking valves will be the first indication of trouble ahead.

Shops, incidentally, have an opportunity here to popularize the use of additives now available for freeing up rings and valves and generally improving the quality of engine lubrication. These additives are available under several brand names, and are simply added to the lubricating oil, the gasoline, or injected through the carburetor.

The condition of the oil filter must be watched these days with especial vigilance. Most filters in use are satisfactory, although some older types will remove detergents as well as abrasive particles from the oil. All

filters if they are to safeguard the life of precious parts, must be kept clean. On some types, it is necessary to install a new cartridge, while other types may be cleaned.

In every lubrication problem, particularly the question of when the engine oil should be changed, the serviceman rather than the owner is the better judge. The serviceman should be guided by factory recommendations, his own experience, and a determination to make every vehicle last as long as possible.

Mack Promotes 2

Appointment of A. N. Morton as vice president and director of Mack Manufacturing Corp. and C. W. Haseltine as vice president of Mack Trucks, Inc. has been announced by L. G. Bissell, chairman.

Morton joined the Mack organization at the end of World War I as chief inspector at Plainfield, N. J. In February, 1943 he became production manager of Mack's extensive factory holdings in Plainfield and New Brunswick, N. J., and Allentown, Pa., a position he still retains.

Haseltine joined the Mack company in 1912 as a clerk. In 1917, he became assistant secretary-treasurer, and the following year was named secretary-treasurer. In his new capacity as vice president, Haseltine will continue his secretary-treasurer duties.



No. 949 Self-Threading Oversize Crankcase Drain Plugs —

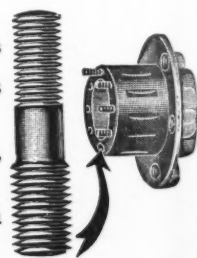
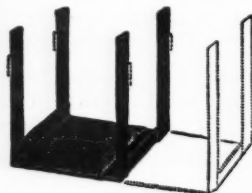


for all popular makes of cars and trucks. A Real Life Saver when threads are stripped or plug is lost. List Price, 25c—35c each

No. 407 Oversize and Standard Rear Wheel Studs for Trucks

—six new numbers just added — now fifteen sizes are available to fit 99% of the requirements. Write for complete Specification Sheet No. 407, giving information on these Studs.

List Price, 20c—35c each



No. 963 Adjustable Battery Carrier

Adjustable to practically all model cars with square type battery from 9 inch to 13 inch—No rivets or bolts for acid to corrode. Black finish — welded construction — easily installed.

List Price, \$1.50 each

No. 431 Battery Carrier for Chevrolet

Models 1937-38-39. A quick repair for these Chevrolet passenger cars. Easy to install, made of heavy gauge, acid resisting steel. Black finish.



List Price, 75c each

ORDER FROM YOUR JOBBER

CHAMP-ITEMS, Inc.

6191 MAPLE AVE., ST. LOUIS, MO.

Oversize and Standard Rear Wheel Studs for Trucks... Self-tapping Oversize Crankcase Drain Plugs and Gaskets for All Cars... Window Regulator Repair Kits... Self-tapping Screw Assort-

ments... Replacement Door Lock Springs... Motor Supports and Shock Absorber Links... Grommets... Replacement Speedometer Cable Assemblies.

American Hammered

*pilots the way
by developing*

CHROME

Piston Rings

By plating airplane piston rings with .005" of Porus-Krome (VAN DER HORST PROCESS), American Hammered has enabled Allied planes to fly five times as many hours between engine overhauls.

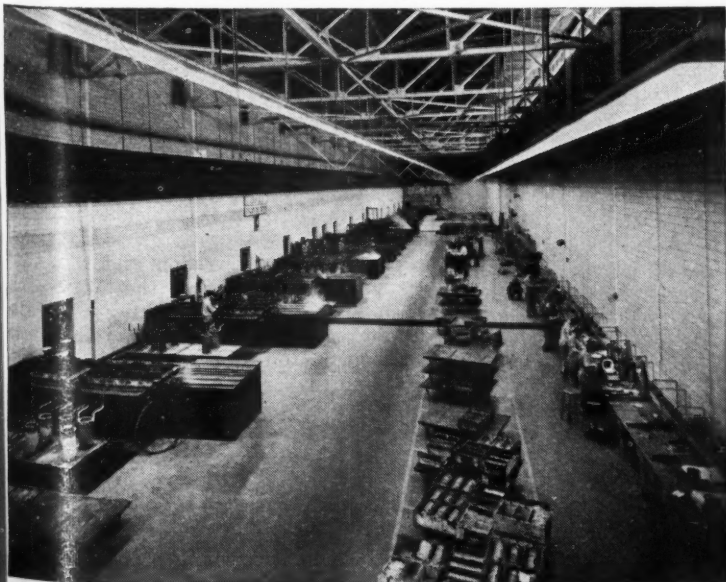
Startling as that fact may seem, it is but part of the story . . . a story whose full details will prove of vital importance to every owner of a motor vehicle . . . a story of compelling interest to every individual or firm selling automotive equipment, or engaged in its manufacture or repair.

Extensive pre-war tests of these American Hammered Chrome rings indicated the general use of them in truck and bus fleets; but when our nation was plunged into the global war, all manufacturing was at once diverted to production of rings for war planes and combat vehicles.

Now in full operation, the tremendous production facilities of this world's largest piston ring Chrome plating plant are ready for conversion to civilian supply the instant that critical materials can be diverted from war uses.

This announcement is presented so that you may have opportunity to parallel, in your own thinking, some of the important services American Hammered is planning right now for Chrome Piston Rings in the post-war automotive field.

KOPPERS COMPANY
American Hammered Piston Ring Division
Baltimore, Md.



World's largest plant for Chrome-plating piston rings.

Synthetic Limits

(Continued from page 58)

think the American motorist will get by pretty good, particularly if he observes the present speed limits, although we will have some problems with cutting and chipping of the treads, and more bruising and separation at the higher speeds. He probably won't get the phenomenal performance he got from pre-war tires, but he is going to be reasonably well satisfied.

"On truck tires, I wish I could tell

you that everything is solved, but I can't truthfully do so. Truck tires made of 100 per cent, or a high percentage of synthetic, present many more difficulties, and particularly in the larger sizes where speed and load make the generation of heat a real problem. This was a problem when crude was used, and synthetic rubber to date does not stand up under this condition as well as crude. A great deal of tread cracking, tread cutting, separation, and blow-outs is experienced."

Thomas reminded his audience, however, that the progress made in

the manufacture and handling of synthetic rubber has been exceptional. "The amazing thing," he said, "is not that we have this problem but that, in such a short time, we have learned as much as we have."

Gas Rations Slashed

IN "equalizing" gasoline rations between the East and Midwest Oct. 1, the OPA slashed allotments for all passenger-car owners except A-book holders in the 12 Northeastern states and in the Midwest. In the 12 Northeastern states, A book holders get what amounts to a ½ gal. boost to 2 gal. weekly, while in the Midwest A-book holders continue to get 3 gal. a week. In the Southeast, holders of A books are cut from 3 gal. to 2 gal. weekly.

In every state east of the Rockies, the value of C and B coupons is slashed from 3 gal. to 2 gal.

The increase for A book holders in the 12 Northeastern states and the District of Columbia is achieved by advancing the valid date of the new ration books to Nov. 8 and making A-8 coupons valid for 12 weeks instead of 16 as was the case with A-6 coupons.

On the Pacific Coast, no change was made in gas allotments, where the value of all rationing coupons remains at 4 gal.

Scrap Recovery, Down

IT has been discovered by H. M. Faust, director of the WPB Salvage Division, that scrap shipments from automobile wrecking yards dropped 10.4 per cent in August, as compared with July shipments. He blames misunderstanding by the yards of WPB Order M-311, which requires the yards to salvage all serviceable parts.

As pointed out here last month, the wrecking yards are thoroughly familiar with the provisions of M-311. Scrap shipments have fallen because the semi-skilled labor needed to dismantle cars in the manner prescribed by the order is not to be had. Consequently yards that try to observe the order scrupulously find their inventory of cars piling up.

The question is, which is more important, used parts or scrap metal? The Salvage Division and the Automotive Division of the WPB hold opposing views. Wrecking yards cannot operate to the satisfaction of both until the question is settled.

Borg-Warner Dividend

Directors of Borg-Warner Corp. on Sept. 10 declared a dividend of 40 cents per share on the common stock of the corporation, payable Oct. 1, 1943, to stockholders of record at the close of Sept. 21.



If you're tired of the slim pickings left in the replacement parts and accessory field—if you're seeking an answer to the problem of **SELLING MORE SERVICE**—take a look at the automotive finishing maintenance picture as it is today.

That's where business is blossoming for profit-minded operators quick to cash in on the amazing variety of materials and methods which McAleer has developed expressly for automotive finishing and maintenance.

Top money maker in the shop has always been McAleer **SPEEDIE-RUB**. This original, double-quick, heavy duty rubbing compound together with the two-way **POLISH** and **CLEANER** and **QUICKWAX** allows you to offer a *complete service* to your customers.

Then, there is the striking line of McAleer Car Cosmetics packaged for maximum sales appeal which has been ringing cash register bells from coast to coast.

Order from your local Jobber or direct from the Factory.

In the shop and over the counter, we suggest that you give this two-way profit making team a chance to prove it is unsurpassed for building business and making **NEW** friends **TODAY** for tomorrow.



McAleer **MANUFACTURING CO.**
Quality-Controlled Finishing Materials
ROCHESTER, MICHIGAN

AMERICA'S LARGEST MANUFACTURER OF AIRCRAFT PROPELLERS!

This is the intricate Hamilton Standard propeller we are building by arrangement with the United Aircraft Corporation, for ten of the world's most famous planes . . . bombers, troop transports, and cargo carriers.

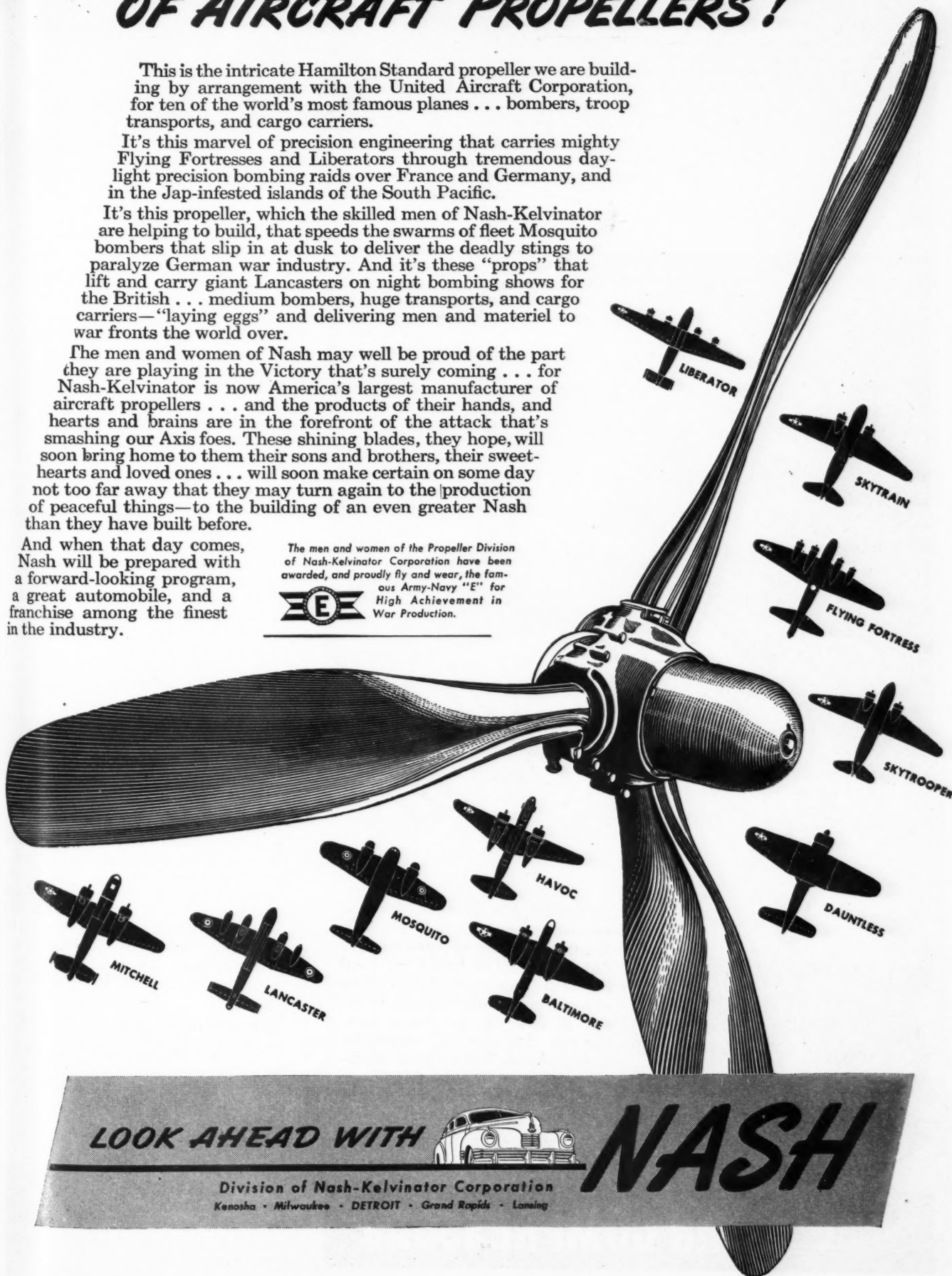
It's this marvel of precision engineering that carries mighty Flying Fortresses and Liberators through tremendous daylight precision bombing raids over France and Germany, and in the Jap-infested islands of the South Pacific.

It's this propeller, which the skilled men of Nash-Kelvinator are helping to build, that speeds the swarms of fleet Mosquito bombers that slip in at dusk to deliver the deadly stings to paralyze German war industry. And it's these "props" that lift and carry giant Lancasters on night bombing shows for the British . . . medium bombers, huge transports, and cargo carriers—"laying eggs" and delivering men and materiel to war fronts the world over.

The men and women of Nash may well be proud of the part they are playing in the Victory that's surely coming . . . for Nash-Kelvinator is now America's largest manufacturer of aircraft propellers . . . and the products of their hands, and hearts and brains are in the forefront of the attack that's smashing our Axis foes. These shining blades, they hope, will soon bring home to them their sons and brothers, their sweethearts and loved ones . . . will soon make certain on some day not too far away that they may turn again to the production of peaceful things—to the building of an even greater Nash than they have built before.

And when that day comes, Nash will be prepared with a forward-looking program, a great automobile, and a franchise among the finest in the industry.

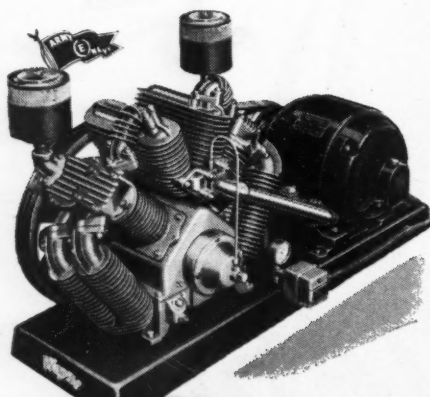
The men and women of the Propeller Division of Nash-Kelvinator Corporation have been awarded, and proudly fly and wear, the famous Army-Navy "E" for High Achievement in War Production.



Lately opened at 453 Golden Gate Ave., San Francisco, this new warehouse of the AP Parts Corp., of Toledo, Ohio, contains 5,000 sq. ft. of floor space. Lea O. Graves is in charge of the new warehouse and office.



Buy U.S.
War Bonds



YOUR Air Compressor is a valuable part of the Nation's transportation system today! Take care of it! We'll be glad to help you. Ask for a free copy of our Maintenance Manual if you do not have one. Wayne Service is available everywhere. Tell us your problems, please. Wayne Air Compressors are still obtainable on Government priorities.

**THE WAYNE PUMP CO.
FORT WAYNE 4, INDIANA**



AIR COMPRESSORS

G.M.C. Truck Brakes

(Continued from page 43)

this position the front edge of the valve should just pass the front edge of the port in the piston rod, allowing atmospheric pressure to enter the front chamber of the power cylinder.

The power cylinder piston should now move slowly rearward or toward the applied position. Now release the valve-rod yoke, allowing it to move toward the front, or away from the cylinder as shown in view "B," Fig. 1, with all clearance between the adjusting bushing and yoke pin toward the front as shown at "D," Fig. 1. The valve should now be slightly past the rear edge of the piston rod port, admitting vacuum to front chamber of the power cylinder. The piston should now move slowly toward the front or "off" position.

If the valve yoke positions as outlined do not cause a corresponding piston movement, the valve is improperly adjusted. To correct the valve adjustment, loosen the locknut "E," Fig. 1, and adjust the valve-rod yoke "F," Fig. 1, by steps of half turns, in the direction necessary to position the valve as previously outlined. When making this adjustment, hold the valve-rod firmly and rotate the valve-rod yoke rather than attempt to rotate the rod. After the correct valve rod setting has been obtained, it is advisable to turn the yoke out one-half turn more and then tighten the lock nut "E," Fig. 1.

Fig. 4 shows the various operating valve positions for the power cylinder.

Synthetic Capping Chart

As an aid to retreaders in handling synthetic-rubber capping stock, The Rubber Manufacturers Association, Inc., has issued a wall chart containing instructions to be followed in order to obtain best results with this new material.

Suppliers of capping stock are undertaking distribution of this chart. Copies may also be obtained directly from the Rubber Manufacturers Association, Inc., 444 Madison Avenue, New York 22, N. Y.



A Thermoid Fan Belt was removed from a Buick, and the weight of a horse suspended from it. When put back on the car, the belt performed perfectly at the same adjustment! That's convincing proof of the advantages of Thermodized Pre-Stretching.

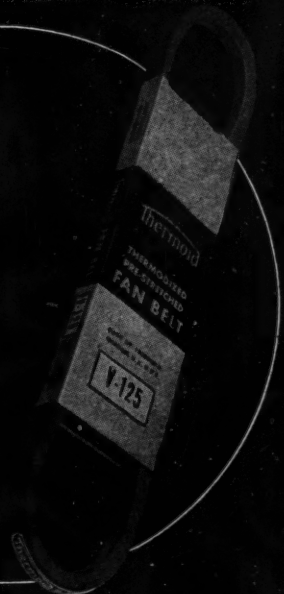
Here is a horse of a different color

YOU CAN STOP FAN BELT TROUBLE
BEFORE IT STARTS WITH

Thermoid

THERMODIZED *Pre-stretched* FAN BELTS

LIKE THOUSANDS OF dealers, you will find they mean increased sales and extra profits because of the Thermoid Sales Reward Premium Plan. Ask your jobber about the Thermoid Fan Belt Program—or write to us, THERMOID CO., TRENTON, NEW JERSEY.



Frazer Quits as Head Of Willys-Overland

Joseph W. Frazer, president and general manager of Willys-Overland Motor, resigned Sept. 30.

His resignation comes at the termination of a contract of approximately five years, during which time Willys-Overland has made a spectacular contribution to the war effort.

Frazer has been president of the Toledo automobile concern since January, 1939, during which period it has grown to one of the 100 largest war arsenals in the United States,

with a volume of armament orders totaling approximately \$250,000,000. Employment in the Toledo automobile plant during his regime has increased to more than 14,000.

During Mr. Frazer's management the firm, with the Army's cooperation, developed as part of its war contribution the now-famous Jeep, and expanded its organization to include the successful fulfillment of volume contracts for artillery shells, aircraft sub-assemblies, aluminum forgings, gun parts, and other armaments. Willys is now the largest arsenal in America for 155 mm.

shells, and one of the largest producers of aluminum aircraft forgings in the country.

14,816 Pass Tests

Results just tabulated show that the seventh annual written examinations for Chevrolet service mechanics, conducted throughout the country during the summer months, broke all previous records in attendance and a new all-time high in the number of men qualifying for diplomas, according to William E. Holler, general sales manager, Chevrolet Motor Division of General Motors.

Final reports showed that a total of 16,686 mechanics participated in examinations held in 1145 cities and towns throughout the country and that 89 per cent, or 14,816, were awarded Approved Mechanic certificates, indicating that they had successfully passed the rigid test of their knowledge of basic and specialized wartime automotive maintenance service methods and techniques.

"During the seven years that the Approved Mechanic plan has been in operation, Chevrolet mechanics have been groomed for their annual national written examinations by continuous intensive training in fundamentals and frequent oral examinations throughout the year," said Holler. "But, since the country has been at war, we have concentrated on training all service men in the new techniques and developments designed to assure the maintenance of cars."

Named Sales Assistant

Graham-Paige Motors Corp. announces the appointment of Glen L. Logan as assistant sales manager. Logan, who attended Cornell University, is 42 and comes to Graham-Paige with a wealth of automotive experience.

W. L. Eaton, vice president, in commenting upon the appointment of Logan, said: "Mr. Logan has been added to our staff in anticipation of our post-war, peacetime expansion program. His experience in the automotive field, including 15 years with the Packard Motor Car Co., where he last served as Assistant to the General Sales Manager, will be extremely helpful in our future plans."

Macauley in Movie

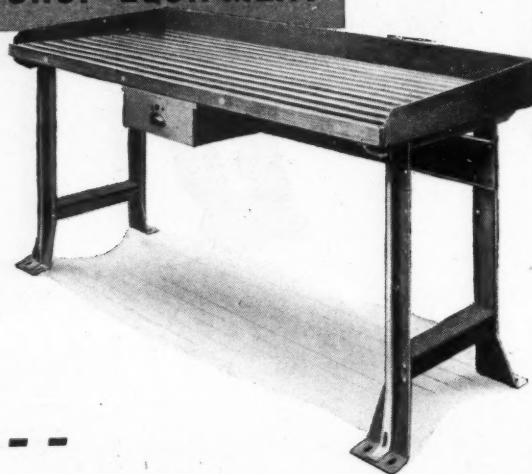
Alvan Macauley, chairman of the board of Packard Motor Car Co. and President of the Automotive Council for War Production, is the principal subject of the new Universal featurette "Wizard of Autos."

Macauley shows in an entertaining picture story the value of having a hobby at which one can relax, no matter how busy the day has been. One of the best equipped home workshops in the country is disclosed in the film in the basement of the Macauley house in Grosse Pointe Shores, near Detroit.



A corner of a modern service shop with "Hallowell" Work-Benches adapted for valve work.

Below — Fig. 928. Pat'd and Pats. Pending. Drawer is extra.



For
adding to
your shop
facilities

Quickly - - -

specify "HALLOWELL" Work-Benches

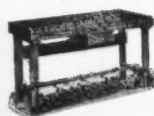
You can choose the work-benches that best fit your needs from 1367 "Hallowell" ready-made bench combinations. Sturdy leg construction

assures their standing firm and rigid without costly bolting to the floor. They are easily moved, and any number can be joined end to end for a long continuous bench.

For use where steel is war-restricted, we are now making "Hallowell" Duration Type Work-Benches of Wood.

Detailed information gladly sent upon request.

"HALLOWELL" Wood Work-Bench



Duration Type

Fig. 1969
Drawer is extra

OVER 40 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 561

BRANCHES

BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO



ALREADY 25,000 DEALERS SAY *"We've Never Received Finer SHOP MANUALS"*

DEALERS everywhere tell us that AC's new Shop Manuals are more helpful than anything developed for the after-market since Pearl Harbor. Yet, these manuals are only one part of a war-time activity which promises even more for the future.

AC IS BUILDING FOR YOUR FUTURE

Right now, AC Spark Plugs are holding old friends, and making many new ones, through superlative performance in civilian use. In addition, the AC Plug Cleaning Service (a conservation service started by AC long before the war) is increasing good will daily by lengthening plug life and conserving gasoline.

Furthermore, new acceptance is being created among millions of fighting men who are seeing AC's "come through" in

battle service. They will be AC enthusiasts after the war.

Finally, behind the scenes, in co-operation with the armed services, AC engineering is continuing to improve the quality, durability, and efficiency of AC Spark Plugs.

A LINE THAT "HAS WHAT IT TAKES"

So,—when peace comes, AC Spark Plugs will be ready to meet the new needs of post-war driving and high octane fuels, just as they have met performance requirements in years gone by. Acceptance and demand will be greater than ever.

If AC's Field Service Engineer has not yet brought your AC Shop Manuals, he will soon. In the meantime, if you want a set, send in the coupon below. Please check which manuals you wish.



**WAR BONDS
—YOUR BEST
INVESTMENT**

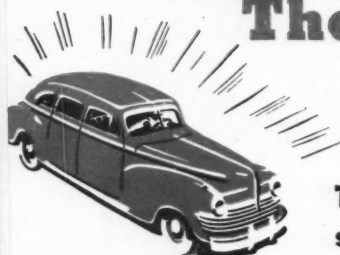
Field Service Department, AC Spark Plug Division
910 Union Industrial Building, Flint, 3, Michigan

Gentlemen: Please send at once, no charge, the AC Shop Manuals checked:

- | | | |
|--|---|--|
| <input type="checkbox"/> HOW TO SERVICE SPARK PLUGS | <input type="checkbox"/> How to Service Oil Filters | <input type="checkbox"/> How to Service Air Cleaners |
| <input type="checkbox"/> How to Service Spark Plug Cleaner | <input type="checkbox"/> How to Service Fuel Pumps | <input type="checkbox"/> How to Service Speedometers |
| <input type="checkbox"/> How to Service Ammeters and other Instruments | | |

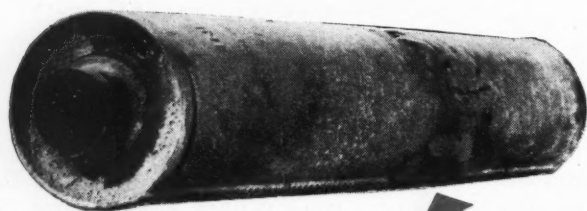
NAME _____
FIRM _____
STREET ADDRESS _____ STATE _____
CITY _____

MA-10



The Youngest Car Will Soon Be 2 YEARS OLD!

The paint may still be slick and shiny. The speedometer and tires won't show much mileage—but it's no happy birthday for the muffler. It may easily look like this!



WHY? Because the same low speeds and low mileages that are necessary to save tires and gasoline are destructive to mufflers.



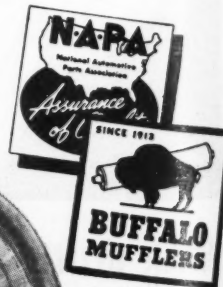
● Result is that the number of mufflers needing replacement is greater today than ever before in automotive history. And they should be replaced, promptly as possible, to protect the car and the driver against the injurious effects of over-heating, faulty combustion, fire hazards, noise and carbon monoxide.

Since 1913, Buffalo Mufflers have been known for rugged and sturdy construction that lets them outlive lesser mufflers. And there has been no change in Buffalo's standards. The same advanced acoustic engineering "stops that noise." The same accuracy of manufacture produces a muffler that will fit, quickly and without loss of time.

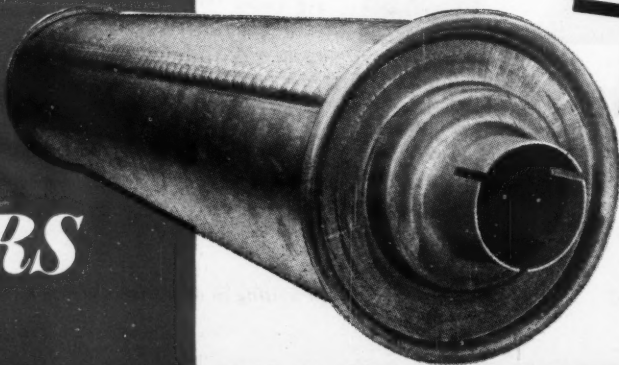
And Buffalo Mufflers are readily available to you through your NAPA jobber and NAPA Warehouses, where master stocks are maintained. For mufflers, see your NAPA Jobber. He's a good man to know.

BUFFALO PRESSED STEEL COMPANY, INC., YOUNGSTOWN, OHIO

Also manufacturers of Buffalo Oil Filters and Kralin-Impregnated Replacement Elements for all Popular Filters. Sold in Canada under the brand-name "KRALINATOR"



Buffalo MUFFLERS



● A complete line of mufflers including straight-through, reverse-flow, shell-type, round and oval designs.

Battery Sales Chief

The Prest-O-Lite Battery Corp., Indianapolis, Ind., has announced the appointment of A. A. "Tony" Feldman as sales manager of Replacement Sales. Feldman will undertake the new responsibility immediately and is moving to Indianapolis from his present residence in Oklahoma City.

Feldman entered the automotive industry as an automotive electrician after which he became sales manager of a large and successful jobbing business. In 1928 he joined the USL Battery Corp. as district manager of the Southern territory, and since 1940 has been Southwestern Division manager of the Auto-Lite Battery Corp.



A. A. Feldman

Fuel Pumps Exchanged

There are three ways, according to the Airtex Automotive Corp., in which repair shops and dealers can participate in the company's fuel-pump exchange plant.

1. For minor repairs, the shop can obtain a number of diaphragm kits which enable the shop to service most of the car models.

2. For emergency repairs, the shop is supplied with a variety of repair kits, containing the metal parts required for a fuel-pump repair job on most of the popular cars and trucks.

3. In most cases, however, the inoperative fuel pump can be exchanged for an Airtex Fuel Pump of the same number, the dealer paying a small price for such service. The dealer gives the old pump to his jobber, who forwards it to the Airtex Factory at Fairfield, Ill.

The old pump is completely overhauled at the factory, the defective parts replaced, and is equipped with an Airtex diaphragm, which is guaranteed for 50,000 miles. The pump is then tested and returned to the jobber.

Battery Convention Canceled

B. F. Morris, president of the Association of American Battery Manufacturers, Inc., in announcing recently the cancellation of the annual convention held normally in October, stated that this action was taken following the appeal of the ODT.

Because of several extremely important matters which can only be properly handled at a convention, Morris said cancellation of the annual meeting worked a rather extreme hardship on the battery industry. It was felt, however, that because of congested conditions on trains and in

hotels, it was the association's patriotic duty to make this contribution to the war effort.

Van Norman Shortens Name

At a special meeting of the stockholders of Van Norman Machine Tool Co., held in Springfield, Mass., on Sept. 10, the form of the company's name was voted changed to "Van Norman Company." The change became effective Sept. 16.

The name "Van Norman Machine Tool Co." was adopted at the time of organization of the company in 1912

when its activities were devoted for the most part to the production of machine tools. In past years the company's activities have been expanded to include production, on an increasing scale, of automotive service equipment and, more recently, products associated with the field of electronics, notably induction heating equipment. The purpose of the change of name to "Van Norman Company" is to abbreviate the present corporate name and to eliminate the implication that the activities of the company are or will be confined solely to the production of machine tools.



Facts about ANTI-FRICTION BEARINGS

Anybody who reads this handy little volume will have a clearer understanding of what bearings do, how they function, all their different types, and how they are applied.

It is "MUST" reading for those who have anything to do with selecting, using or servicing bearings. No "selling" in it—just 32 pages of simple common sense, with more than a hundred helpful diagrams, phantom drawings and photographs. Handy pocket size.

A copy will be sent you on request.

AHLBERG
BEARING COMPANY

Manufacturers of CJB Master Ball Bearings
3028 W. 47th St., Chicago, Ill.


While building these..



PONTIAC



On the Record of Pontiac Motor Cars

 In many areas, 75% or more of the war workers depend upon privately owned transportation. In all weather, under all conditions, 365 days a year, these privately owned cars *must* provide sure, dependable transportation to get workers from homes to their jobs of building guns, tanks and other implements of war.

And it is interesting to note that it took a war to reveal to original owners the actual value built into Pontiac motor cars. In the past many cars were traded in with low mileage—and the original owner never

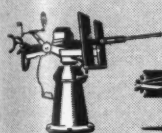
used or realized the long-life features which were built into his car. Now, when it is impossible to buy new cars, owners are discovering—according to letters from all over the United States—that the fine engineering and the rigid manufacturing standards make it possible to operate Pontiacs day in and day out with less trouble, less delay and less expense than any car they have ever owned.

Naturally, we point with pride to the fine wartime record of Pontiac cars.

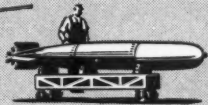
PONTIAC



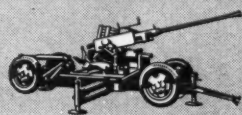
DIVISION



Oerlikon 20-mm.
Anti-Aircraft Cannon



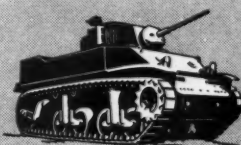
Aircraft Torpedoes
for the Navy



Bofors
40-mm. Field Guns



Diesel Engine
Parts

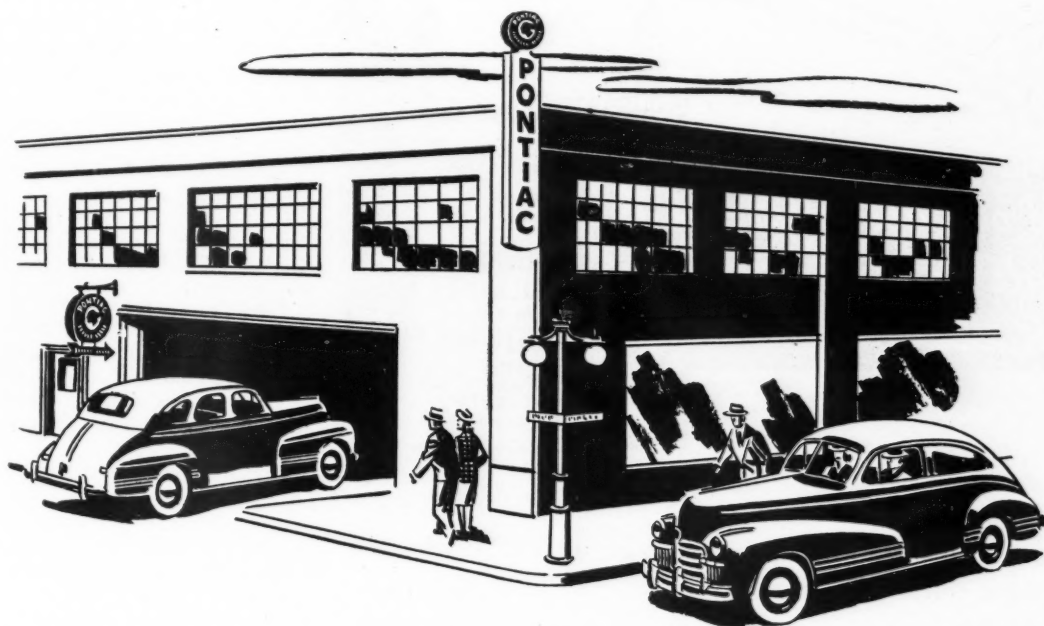


Axles for
M-5 Tanks



Engine Parts
for Army Trucks

reports with *Pride...*



On the Record of Our Dealer Organization

We can report with pride, too, on the splendid backing the Pontiac dealer organization has provided for a fine car.

The service facilities provided by Pontiac dealers have played an important part in keeping America's war workers rolling to work.

This was not an easy task. To accomplish it, Pontiac dealers were forced to train mechanics, work under

new and unusual conditions, supplant routine methods with ingenuity and resourcefulness. That they have carried on, that they have provided good service under difficult conditions, that they are prepared to continue serving their owners, is a fine tribute to their loyalty, their cooperative spirit and their business ability.

We at the factory point with pride to Pontiac dealers and the enviable wartime record they have established.

GENERAL MOTORS

ON OF

SELL *all* YOUR TIRE CHAINS



Find out how you can sell all odd sizes and old stocks

MCKAY
MULTI-GRIP
TIRE CHAINS
ONE PAIR
28 x 6.00-16
HARDENED
MANUFACTURED BY
THE MCKAY COMPANY
PITTSBURGH, PENNA.
MADE IN U.S.A.

As Tire Chains come to you, they are a proper fit for the sizes marked on the bag. But, with the shortage of Tire Chains, it is your patriotic duty to see that even *odd sizes* and *old stocks* are sold and put to use. Often, they are usable on popular sizes although not a perfect fit. Others can be made to fit by cutting them down with a bolt cutter and salvaging the Cross Chains removed.

Ask your Jobber how to use *old stock* and *odd sizes*. If he doesn't know, *he can get the information* for you from his Tire Chain manufacturer.

Important Note: Don't let your customers throw away any old chains! More Cross Chains than complete sets will be available, and you can satisfy more customers and save critical steel for the war effort by repairing those old Chains instead of selling new sets.



REGULAR AND BAR-REINFORCED MULTI-GRIP TIRE CHAINS

THE MCKAY COMPANY
PITTSBURGH, PA.

WELDING ELECTRODES . . . COMMERCIAL CHAINS . . . TIRE CHAINS

MCKAY TIRE CHAINS ARE DISTRIBUTED THROUGH JOBBERS

Minnesota Dealers Name New Manager

George F. Ziesmer, president of the Minnesota Automobile Dealers Association, has announced the appointment of Glenn B. Atcheson as manager of the association, effective Sept. 15.

Atcheson for the past 18 months has been associated with the Reconstruction Finance Corporation as tire consultant-handling the Idle Tire Purchase Plan, scrap concentration and purchase of frozen tire stocks from the dealers in the 9th Federal Reserve Bank area. He was formerly associated with the Firestone Tire and Rubber Co. as manufacturers representative, contacting the automobile manufacturers and as district manager for the northwest with office at Minneapolis. He left Firestone to enter the Ford business at Sioux Falls, S. D., and was later merchandise manager for the W. R. Stephens Co., at Minneapolis.

Occupies New Building

To serve its many distributors better through its 25 strategically located branches throughout the country, The Toledo Steel Products Co., makers of automotive and aircraft parts, has consolidated all its sales and distribution activities under one roof by moving into the recently acquired building at 720-724 Monroe St., Toledo, according to J. E. Adams, vice president.

The large building, which provides an additional 50,000 sq. ft. of floor space, has been completely remodeled and redecorated for use by Toledo Steel Products. Consolidation of the company's sales offices with its stock and inventory control departments are expected to effect many economies and greatly to facilitate the company's service to its national outlets. It will also provide the necessary space for the addition of many other facilities that are being planned for the post-war period.

Hub Riley, has been appointed to manage the Toledo headquarters.

Charles D. Hogan

Charles Driscoll Hogan, secretary of The United States Electrical Tool Co., Cincinnati, Ohio, died July 20. He was 48.

Born in Kentucky, Hogan attended St. Xavier High School and University. He was a veteran of World War I, retiring with rank of lieutenant. He became associated with the tool company in 1920 and was elected to the board of directors and made secretary in 1922.

Hogan was very interested in the electrical tool industry and was instrumental in effecting many of the practices now in universal use by most leading concerns.

'em Rolling" BOOK

Service Book to your Customers

Just published!...Free to dealers through Auto-Lite

Here's another step-ahead Auto-Lite promotion to keep you in the spotlight and help you win and hold friends. Forty money-saving, mile-adding pages show car owners how to care for their car for their country. Dozens of worth-while tips tell them how to use your friendly service to stretch gas rations and keep cars rolling until Victory.

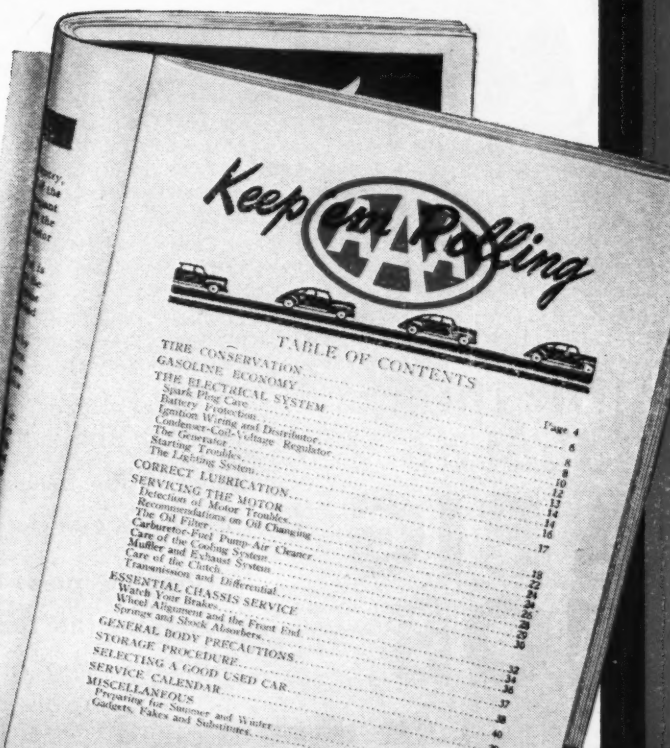
Watch these books work for you. Get your FREE supply of 25 now—this coupon brings them. It's all a part of Auto-Lite's record-setting program planned to help dealers everywhere. Sign and mail this coupon for your 25 free books today.

THE ELECTRIC AUTO-LITE COMPANY

TOLEDO, 1, OHIO

SARNIA, ONTARIO

BUY WAR BONDS



25 BOOKS SENT TO YOU FREE

THE ELECTRIC AUTO-LITE COMPANY (5)
TOLEDO 1, OHIO

You can send prepaid my supply of the new AAA "Keep 'em Rolling" Book. I understand there is no charge for the books or postage.

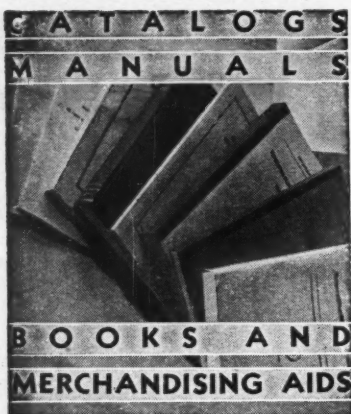
NAME

FIRM

ADDRESS

CITY STATE

**SPARK PLUGS • BATTERIES
STARTING • LIGHTING • IGNITION
WIRE and CABLE**



A revised edition of its catalog section on "The Properties of Ameripol D," its oil- and heat-resisting synthetic rubber used in many specialized industrial applications, has just been published by The B. F. Goodrich Co. and is now available upon request.

The catalog section discusses the properties of Ameripol D, including its resistance to various substances which are the enemies of natural rubber, hardness, tensile strength, elongation, weight, color, odor and taste, elasticity and permanent set, resistance to tear, abrasion, flexing, oils and solvents and heat.

Two pages are devoted to pages listing in table form the properties of the various compounds of Ameripol D, including a rough guide indicating the services where use of the synthetic rubber is practical.

* * *

A new bulletin, Form No. 11543-1 SUP, describing the uses of the four available types of Cyclodiene Base Hydro-carbon Solvent Degreasers and Cleaners for metals, will be mailed free to any inquirer by Dept. W, Technical Process Division of Colonial Alloys Co., 2154 E. Somerset St., Philadelphia, Pa.

An interesting section deals with painting or lacquering on the wet surfaces immediately after the work comes out of the bath, which is operated at room temperature. Another tells of the protective rust inhibitive film left on the surfaces of the work after being degreased in Cyclodiene.

* * *

The Phillips Pump and Tank Co., Cincinnati, Ohio, has just issued a new catalog, B-24, describing its entire line of Service Station Equipment. This catalog fully describes each item now manufactured by the firm and, in many instances, goes into complete details of the units described. A copy and further details of the units listed may be obtained by writing direct to the manufacturer.

* * *

The National Standard Parts Association has just released "The Automotive Jobber and His Personnel," a 12-page illustrated booklet designed to aid wholesalers in retaining key employees by taking full advantage of the Selective Service Division's recent ruling under which "repair parts experts" as well as maintenance mechanics now are defined as essential to the war effort.

Because many local draft boards are unfamiliar with the real and indispensable functions of an automotive maintenance wholesaler, the new booklet presents in terms readily understandable by persons unfamiliar with the industry a new and timely story of wholesaling and reveals the highly important part the jobber plays in the national effort to maintain motorized transportation.

* * *

A new catalog issued by the Leonard Spark Plug Co., Newark, N. J., under the subtitle "Duration Edition," contains a complete comparison chart of plugs for all popular makes of cars, together with full specifications. This company manufactures the well-known Leonard Air-Cooled Spark Plug, the only patented air-cooled plug on the market. Another distinguishing feature of the Leonard Plug is its flat-sided electrodes, which make frequent regapping unnecessary.



Little Things that do A BIG JOB

In the old fable the tiny mouse gnawed a hole in the net and set the lion free. Proving that little things can do a big job.

Ignition parts are the "little mice" of the replacement field. Although small in size their task is a big one—to keep motor vehicles in continuous operation.

Users of Blue Streak Ignition Parts know that this time-tested, dependable line keeps 'em rolling—without risk of ignition failure. Vitally important these days, when Victory itself depends on uninterrupted motor transportation.



**STANDARD MOTOR
PRODUCTS, INC.**

37-32 Northern Blvd., Long Island City, N.Y.

For "Long-Life Peak Performance" use Blue Streak Ignition Parts

"So I ought to be pleased with the way my Chrysler is standing up? Brother, that's soft talk!

"I'm amazed . . . proud . . . delighted!"

"Sure, they told me about all the new Chrysler ideas that make cars run better and last longer. But it took tough wartime use to bring home to me what they meant.

"Take Superfinish. Chrysler polishes moving parts and bearing surfaces in the engine—some down to a millionth of an inch, till they feel like a mirror under your fingernail.

"That was nice. But not having to break the engine in made it *mean* something. And best of all . . . I just don't have the repair bills you might expect after such hard use.

"I always knew Chrysler made a good car . . . but I never knew *how* good till now. From now on, just let anybody try to pull Chrysler and me apart!"

**"Pleased, hell . . .
I'm delighted!"**



BACK THE ATTACK—WITH WAR BONDS

Of all the many war jobs on which Chrysler Division is currently engaged, the big majority are built around Chrysler engines. » » On all the fighting fronts, men of the armed forces are operating these engines . . . learning how well they are built . . . how faithfully they serve in time of stress. They are gaining an increased respect for all-around Chrysler performance.

» » Naturally, we are determined to merit this

favor. Hence, into every Chrysler war engine goes our best work . . . to hasten the day when the big headlines and the crowds will celebrate our victory.

WAR PRODUCTS OF CHRYSLER DIVISION:

Industrial Engines • Marine Engines • Tank Parts • Navy Pontoons • Marine Tractors • Harbor Tugs • Anti-Aircraft Cannon Parts • Tank Engine Assemblies • Airplane Wing Panels • Fire Fighting Equipment • Air Raid Sirens • Gun Boxes • Navy Searchlight Reflectors.

CHRYSLER



DIVISION OF CHRYSLER CORPORATION

Battery Limit Upped

(Continued from page 53)

Manufacturers authorized to increase production to this extent are those that sold more than 25,000 units in 1941. Those manufacturers who sold less than 25,000 units in 1941 are permitted to increase their output to equal that quantity for the year 1943.

Manufacturers located at Niagara Falls, N. Y., Los Angeles and San Francisco, Cal., Portland, Ore., and Seattle, Wash., are excepted from

the authorization contained in the new order.

Building of 33,852 Trucks Is Authorized by WPB

THE WPB has approved the building during 1944 of a total of 33,852 motor trucks and 14,067 trailers. Most of the vehicles will be produced during the first six months of next year. Further manufacture may be authorized for the second half.

Of the heavy trucks authorized, 5,282 will range from 16,000 to 21,999 lb. gross vehicle weight, and 630 from 22,000 to 26,999 lb. gross vehicle

weight. In the heaviest classification, 27,000 lb. gross vehicle weight and over, 5,081 vehicles are authorized.

The vehicles to be built will include general freight trailers, logging trailers, pole trailers, petroleum and milk tanks, and heavy-machinery haulers. Over and above the 33,852 highway trucks and trailers, 1,500 off-the-highway trucks also have been authorized.

Chevrolet will build 8,449 trucks, Ford 7,169, and Dodge 2,763. Other companies included in the program are Autocar, Brockway, Corbitt, Dart, Diamond T, Duplex, Four Wheel Drive Auto Co., General Motors Truck & Coach Division, Yellow Truck and Coach Mfg. Co., International Harvester, Mack, Oshkosh Motor Truck, Peterbilt Motors, Reo, Sterling, Walter Motor Truck, and White.

Anti-Freeze Speeded

INDUSTRIAL alcohol manufacturers with national distribution have been ordered by WPB to supply specified quotas of anti-freeze to the 14 Western states upon receipt of orders from dealers. The move was made to insure an adequate supply of anti-freeze for passenger-cars before cold weather sets in. The states affected are Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming.

Distribution had been ordered on the basis of last year's alcohol anti-freeze shipments, but certain amounts of calcium chloride now forbidden, were used last year, with the result that the 14 states faced the prospect of shortages during the coming winter.

Piston Ring Makers On Advisory Body

UNDER the chairmanship of Norman B. Johnson, government presiding officer, 10 officials of piston-ring manufacturing companies have been named to the WPB Piston Ring Manufacturing Industry Advisory Committee.

Committee members are David A. Cowhig, Wilkening Mfg. Co.; T. Latimer Ford, Koppers Co.; A. E. Johnson, Hasting Mfg. Co.; Herbert W. Knapp, McQuay-Norris Mfg. Co.; George C. Landon, Wausau Motor Parts Co.; Neil A. Moore, Sealed Power Corp.; H. M. Ramel, Ramsey Accessories Mfg. Corp.; Don H. Teetor, the Perfect Circle Co.; Harold G. Vaughan, Muskegon Piston Ring Co., and F. M. White, Liberty Foundries Co.

Truck Committee Named

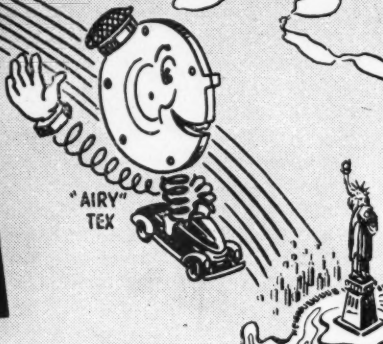
REPRESENTATIVES of 12 truck manufacturers, three trailer manufacturers, and three bus manufacturers (Continued on page 146)

8 ROUND TRIPS

Between NEW YORK and SAN FRANCISCO

50,000 MILES

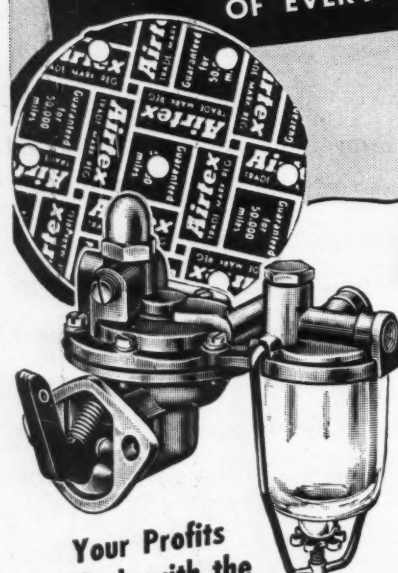
OF SERVICE GUARANTEED IN THE DIAPHRAGM OF EVERY . . .



AIRTEX

Exchange FUEL PUMP

Your jobber can provide a perfect AIRTEX replacement for every ailing fuel pump — an AIRTEX Exchange Pump of the same type, at a low exchange price. Take your ailing fuel pumps to your AIRTEX jobber today.



Your Profits Climb with the AIRTEX Line

Back the Attack with War Bonds

AIRTEX AUTOMOTIVE CORPORATION
FAIRFIELD, ILL.



Back of the Attack -

Workers, who produce essential weapons and materials of war, can't waste time on call-backs for readjustments to their new brake lining installations.

That is why, despite Inland's large production for military needs, your jobber can probably still meet your requirements for time-saving, original quality Inlite Brake Lining.

You see, Inlite goes on fast—comes into normal operation at once and stays that way. Call-backs are eliminated. Time is saved.

So ask first for Inlite—it goes on faster to deliver extra miles of dependable, efficient brake performance. It backs your attack on the home front battle of transportation.

A UNITED MOTORS LINE available everywhere through United Motors Service distributors



MAKE AMERICA STRONG
Keep on Buying War Bonds

VICTORY WORK BY INLAND

Enlisted for Victory are the following products of Inland's Laboratory Controlled Manufacture: carbines; plastic helmet liners and extinguisher horns; tank tracks and clutches; Army truck clutches and brake linings; Army and Navy aircraft steering wheels; gun sights and shoulder rests; Marine engine motor mounts; parts for airplane motors, submarine chasers, torpedo boats, artillery lighters and landing craft.

INLITE
BRAKE LININGS • CLUTCH FACINGS



Inland Manufacturing Division
General Motors Corporation, Dayton, Ohio



**UNCLE SAM'S
MOST POWERFUL
WEAPON**



**BUY MORE
WAR BONDS
AND
END THE WAR**

**REPLACE WITH EIS BRAKE PARTS
AND END BRAKE TROUBLES**

YOU can't exercise too much care in the selection of replacement parts for the brake system. That's the one branch of overhaul where "trouble" is dangerous.

Replace with Eis Brake Parts and you put an end to brake troubles. The sound engineering principles and durability for which this line has become famous are assurance of lasting service.

If you have not been able to procure as much Eis material as you require, there is a reason. We are engaged in the manufacture of war materials. We are, however, working feverishly to keep up with the demands made on us in our own line, and take this occasion to assure our customers that no effort is being spared to keep them supplied with brake service parts—to the full limit of our ability.

EIS MANUFACTURING CO., INC.
MIDDLETOWN, CONN.



Can you use

L **LEONARD #14-B** will help to overcome fouling in your troublesome Buick, Chevrolet and other 14 mm. installations. We believe this plug to be the hottest 14 mm. spark plug made today.

Leonard has the right type of plug for all war-time driving conditions.

See your Jobber or write Factory for complete Catalog.

LEONARD SPARK PLUG CO., INC.
NEWARK, N. J.

**HOTTER
14 mm.
PLUG ?**

LEONARD

**PATENTED
air
Cooled**

**SPARK
PLUGS**

Air Express 16 Years Old

Commercial air express observed its 16th anniversary Sept. 1. It was on Sept. 1, 1927, that the first regularly scheduled air-express service was started in the United States. At some 26 cities from coast to coast, airline and express officials witnessed the start of an air-cargo service destined to grow from 17,000 shipments in 1928 to more than 1,405,000 shipments last year.

Many of the first mail and express ships were single-engined, open-cockpit biplanes, says the Air Express Division of the Railway Express Agency. Packages were stowed wherever there was room. Often the pilot sat on the cargo. Coast-to-coast shipments required 36 hours and 16 refueling stops, compared with present-day 16-hour overnight transcontinental flights. Today's inter-city schedules are twice as fast as those of 16 years ago, while rates are one third what they were in 1927. A 25 lb. package from New York to the West Coast cost \$65 in 1927; today the rate is \$21. The most recent rate reductions, effective July 15, were indicative of how growing air express volume benefits the shipper.

Builds Wooden Trailers

One-ton trailers for military vehicles are now being produced in mass quantities by Willys-Overland Motors, it is announced today by Raymond J. Fitness, operating manager in charge of manufacturing.

Designed to conserve vital steel by the use of a composite-wood body, the vehicles are being turned out on the same assembly lines used to manufacture quarter-ton amphibian trailers for the company's jeeps, he said.

Unlike the smaller cargo carriers, Fitness pointed out, the new trailers can be attached to any size truck and are equipped with wheels and tires that are interchangeable with those of standard military vehicles.

Response 100 Per Cent

When the Arrow Safety Device Co., of Mt. Holly, N. J., called in its sales representatives for a meeting recently, the response was 100 per cent. Representatives attended from as far away as the Pacific Coast.

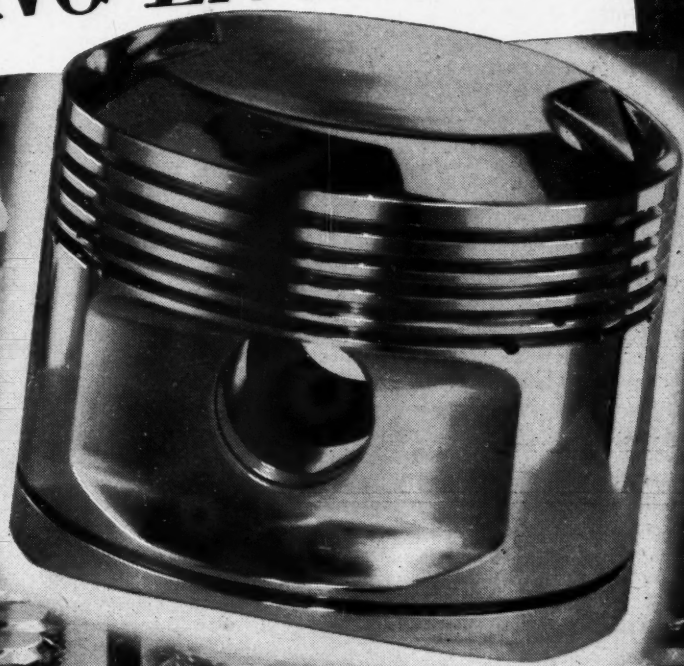
The gathering discussed the recent expansion of facilities by the company and the plans being laid for post-war business.

Faust Heads Salvage Unit

Herbert M. Faust, advertising manager of the Curtis Publishing Co., Philadelphia, has been named director of the Salvage Division of the WPB, succeeding Paul C. Cabot, of Boston, who resigned recently because of ill health.

As director of the Salvage Division, Faust will head an organization of nearly 1,000 employees.

JEWELS for FLYING ENGINES



THEY HAVE TO BE BUILT RIGHT

THEY ARE indeed jewels of precision—these pistons which flow by the thousands from Hudson production lines, bound for service in the fighting heart of famous Wright Cyclone engines.

Finish dimensions, for example, must be accurate to 10 millionths of an inch, and weight to 4 hundredths of a pound—tolerances unknown in pre-war automobiles, fine as they were.

This is one of many war contracts (including Oerlikon 20-mm. anti-aircraft guns, Hudson Invader engines, wings for Hell-divers and fuselage sections for

Marauder bombers) to which Hudson has brought the 34-year experience of an organization trained in mass production, schooled in high precision, and used to hard-hitting teamwork.

Teamwork is also playing its part on the transportation front. Hudson distributors and dealers—backed by a nationwide system of parts distribution—are making good their pledge to "keep 'em rolling."

When peace comes, we'll be building finer - than - ever Hudsons to be sold by our coast-to-coast organization.



A few of many types of U. S. warplanes equipped with Wright Cyclone engines.



Aviation Division
Awarded
Army-Navy "E" for
High Achievement
in War Production

Back the Attack with
U. S. War Bonds

HUDSON

MOTOR CAR COMPANY

DETROIT 15, MICHIGAN

34 Years of Engineering Leadership

OUR PLANTS ARE DEDICATED TO WAR PRODUCTION...OUR DEALERS TO MAINTAINING WAR TRANSPORTATION!

OCTOBER, 1943

When writing to advertisers please mention *Motor Age*

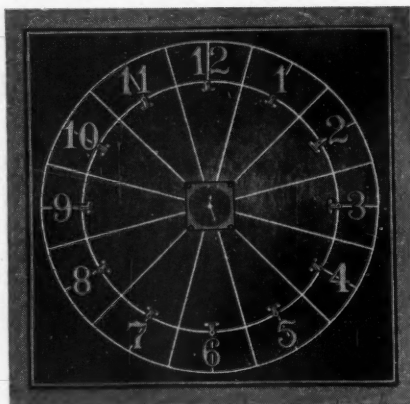
143

Delivery Clock Speeds Service

THE problem of keeping close contact with the flow of promised work through his shop has been solved by Joe Seeber, service manager for Johnson Bros., Motor Co., of Dallas, Tex., Chevrolet distributors, by a simple, inexpensive, and highly effective device of his own making.

The equipment consists of a 36-in. square sheet of $\frac{3}{8}$ -in. plywood. The sheet is painted black, and upon it is a 30-in. circle. At center of this circle a square hole contains a small clock, which cost \$1.50. The circle is divided into 12 equal sectors, and numbered clockwise with metal numerals. Around the circumference, one in each sector, are mounted spring clips. These are affixed to the board with small brass hooks.

During rush periods, orders are slipped into the clips according to the hours at which their completion has been promised. When any such order runs late, a mere glance at the "clock" indicates the fact. The order can then be checked immediately to determine the reason for delay.



The plan further reduces the temptation for the receiving crew, to make rash promises, Seeber points out, since the man taking in a job can see how much work has been promised for a given hour.

The device cost next to nothing. All of the work was done in the shop. —John D. Mueller.

Mounting Synthetic Tires

With introduction of synthetic rubber tubes for automobile tires, The Goodyear Tire & Rubber Co. has announced a list of directions and precautions to be followed in placing the tubes in use.

Although the synthetic rubber tubes will serve generally as well as pre-war natural rubber tubes, Goodyear pointed out that the former present several new problems.

For instance, because synthetic rubber is not so elastic as natural rubber, it is subject to base splitting if caught even temporarily under a bead and subjected to undue stress or strain at any point during the mounting operation.

H. E. Ammerman, manager of Goodyear's Tire Service Department, said a large number of synthetic rubber tubes were mounted in a testing program before they were released for sale. No trouble is to be expected if these Goodyear-recommended instructions are followed, he said:

1—Inflate the tube about three-quarters full, or to the point where it starts to round out. Then insert the tube in the casing.

2—When the tube is inside the tire, paint both tire beads and base of the tube with a thin soap-and-water solution, made with high-grade soap flakes.

3—Mount the tire on the rim and adjust to centered position so that the beads are out of the rim well.

4—Inflate the tube to seat the tire beads firmly against the rim flanges. Then remove the valve core, deflate the tube completely, replace the valve

core and re-inflate to operating pressure.

Ammerman warned that punctured or damaged tubes should be vulcanized.

Tompkins Rubber Aide

L. D. Tompkins, of Wilton, Conn., has been named deputy rubber administrator, it has been announced by Rubber Director Bradley Dewey.

Also announced were the appointments of Earl B. Babcock, of Akron,

MOTOR REPAIRING
TIRE REPAIRING
ALZO
HORZE ZHOEING



"I'm afraid the change-over was just a little too much for Spike."

Ohio, as assistant rubber director in charge of product development and conversions; of Frank Creedon, of Brockton, Mass., as assistant in charge of construction; and of Dr. Edward R. Gilliland, of Cambridge, Mass., as assistant in charge of research and development.

Opens Branch Office

Kennametal Inc., with factories and main office at Latrobe, Pa., opened a Philadelphia office and warehouse at 3701 North Broad St., Philadelphia, Oct. 1, for the direct sale, tool engineering and service in the distribution of the company's products in the area comprising Eastern Pennsylvania, Southern New Jersey, Maryland, the District of Columbia, Virginia and certain other specific areas. Wm. S. Jones, of Kennametal Inc.

Firm Name Changed

Robert A. Emmett, president and chairman of the board of Detroit Rex Products Co., metal cleaning engineers, states that Detrex Corp. replaces Detroit Rex Products Co. as the new firm name. No change in ownership, company policy or management will be made.

This company, which manufactures degreasers, alkali and petroleum spirits washers and emulsion cleaners, degreasing solvents and alkali cleaning compounds was established in January, 1920.

Army-Navy "E" Awards

Aro Equipment Corp., Bryan, Ohio. (Star)

Micro Switch Corp., Freeport, Ill. Continental Rubber Works, Erie, Pa. (Star)

B. F. Goodrich Co., Niagara Falls, N. Y., and Louisville, Ky. (Stars)

A. Schrader's Son, Brooklyn, N. Y. (Star)

Propeller Division, Nash-Kelvinator Corp., Lansing and Grand Rapids, Mich.

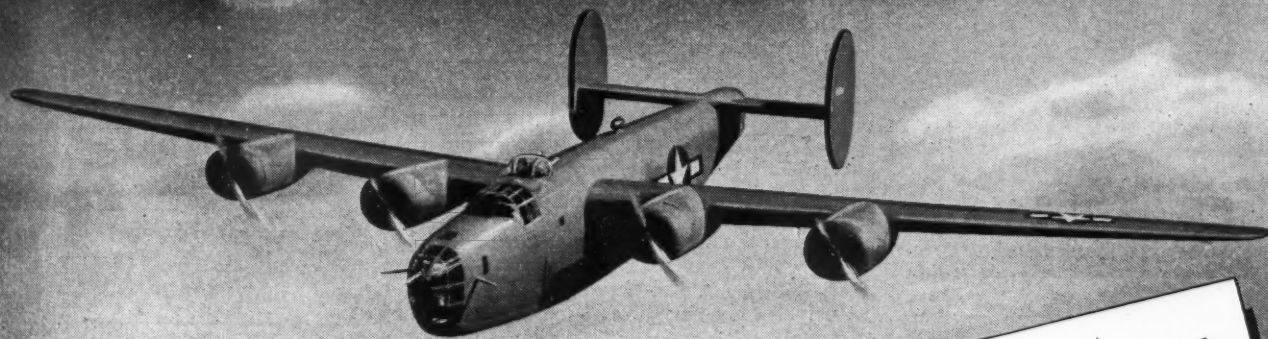
Named Technical Aide

Armin L. Nevers has been appointed by the Osborn Manufacturing Co., Cleveland, Ohio, world's largest manufacturer of power brushing wheels, as its technical representative in Wisconsin, following through in the development of a territory in which he has already had many years of sales experience.

Accepts Bible Week Post

Clarence C. Carlton, vice president and secretary of the Motor Wheel Corp., Lansing, Mich., has accepted the designation of Honorary Vice Chairman of National Bible Week for 1943, representing the Automotive Parts and Equipment Industry.

ACHILLES IN SEARCH OF A HEEL



WHEN BETTER ^{war goods} AUTOMOBILES ARE BUILT BUICK WILL BUILD THEM

Keep America Strong



Buy War Bonds

This is a Liberator bomber.

It is a mighty warrior.

It ranges the Seven Fronts, searching out targets to smite with devastating effect.

Europe knows it. And Asia. The conquered Low Countries, the Pacific, the East — Near and Far — and the battered cities of Germany that never were to feel the impact of bombs.

It carries a husky load, does the Liberator.

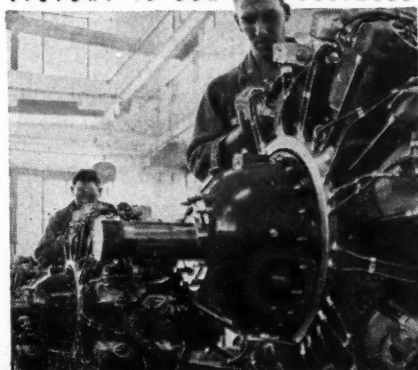
It has four big Buick-built Pratt & Whitney engines that get it in over the target fast and often.

It has an accuracy to make a Dan'l Boone chortle.

Why do we show it?

Well, because *any* American has a right to be proud of the name this truly American ship is making for itself.

VICTORY IS OUR BUSINESS



And particularly because it is our prideful assignment to build original-equipment engines for the Liberator — engines that give this ship its first start in a history-making life.

Can you blame us for feeling good every time the dispatches report the exploits of this mighty air-warrior?

The Army-Navy "E" proudly flies over Buick plants in both Flint, Mich., and Melrose Park, Ill., having been awarded to Buick people for outstanding performance in the production of war goods.



Buick powers the Liberator

BUICK DIVISION OF GENERAL MOTORS

Every Sunday Afternoon — GENERAL MOTORS SYMPHONY OF THE AIR — NBC Network

When writing to advertisers please mention Motor Age

OCTOBER, 1943

145

KEEP YOUR HAT ON, MAJOR,
I CAN STOP, I'VE GOT,
"SOUTHERN"
REG. U. S. PAT. OFF.
BRAKE LINING

SOUTHERN
FRICTION MATERIALS CO. - CHARLOTTE, N.C.



**"You can depend
on American
Hydraulics' Jacks"**

•

American Hydraulics, Inc.
SHEBOYGAN, WISCONSIN

★
*They're keeping them
looking new....*

The Quick and Easy
ZECOL
Way

ZECOL Inc.
Sole Manufacturers
Milwaukee, Wis.

Truck Committee Named

(Continued from page 114)

ers are included in the Industry Advisory Committee for the Commercial Motor Vehicles Manufacturing Industry to cooperate with the OPA on existing and proposed price measures. Those serving on the committee are:

H. Morton Coale, vice president, Autocar Co.; Henry E. Hund, president, Reo Motors, Inc.; William E. Fish, commercial car manager, Chevrolet Motor Division; Leslis V. Brown, manager truck division, Ford Motor Co.; George Pratt, director of sales, Hudson Motor Car Co.; Robert W. Dibble, manager of domestic truck sales, International Harvester Co.; Albert C. Fetzer, vice president, Mack Manufacturing Co.; Earl J. Bush, vice president, Diamond T Motor Co.; George H. Strock, Commercial Car Division, Dodge Division; Carl Loud, sales manager, Federal Motor Truck Co.; Richard G. Hudson, manager, Commercial Car Division, Studebaker Corp.; George Harold Bell, director of sales, Willys-Overland Motors, Inc.; A. Kenneth Tice, general sales manager, Fruehauf Trailer Co.; Elbert J. Lucas, sales manager, Kingham-Trailer Co.; Marshall N. Terry, vice president, Trailer Co. of America; Joseph P. Little, vice president, Yellow Truck & Coach Division; Yale R. Shively, president, Wayne Works; John N. Bauman, vice president, White Motor Co.

Recent Rulings

TRUCK TIRES. Trucks are now eligible for recapping services and new tubes, upon obtaining rationing certificates, regardless of the use to which the vehicles are put. Formerly only vehicles which local War Price and Rationing Board considered essential to the war effort were eligible. The ODT announces that its district officers will attempt to locate tires needed by all classes of trucks when the owner or operator is unable to find the proper tires in his own country. A request to the ODT office will be transmitted to the Office of the Rubber Director, which will undertake to arrange distribution so that all tire certificates can be honored quickly.

* * *

ARMY TIRES. Re-examination of Army scrap piles by agents of the Office of the Rubber Director is expected to add many serviceable passenger-car tires to the civilian supply, the OPA announces. Tires salvaged will be sold to dealers upon authorization of the OPA district office. Used passenger-car tires in the hands of manufacturers may be transferred similarly. Tires too badly worn for recapping and branded "O" by the dealer to indicate that they may be sold only as an emergency casings

(Continued on page 147)

BUELL AIR HORNS
AVAILABLE ON PRIORITY

Manufacturers of High Pressure Air Horns for cars, trucks, busses, boats and railway trains since 1912, our production is now devoted entirely to the War Effort. After Victory Buell Air Horns will again be available for old and new cars.

BUELL MANUFACTURING CO.
2991 Cottage Grove Ave., Chicago, Illinois

Since 1897

**UNITED STATES
ELECTRICAL TOOLS**

have never swerved from their
original standards of **QUALITY
AND SERVICE.**

**THE UNITED STATES
ELECTRICAL TOOL CO.**
CINCINNATI, OHIO

ONLY WALKER SILENCERS HAVE

"I-T"

**SEE YOUR WALKER JOBBER
ABOUT "INDIVIDUAL TUNING"**

FITZGERALD
GASKET CRAFTSMEN SINCE 1906
GASKETS

*The complete line
that completely satisfies*

The Fitzgerald Manufacturing Company
Torrington, Conn.

BALDOR

**ELECTRICAL SPECIALISTS
FOR 22 YEARS**

Manufacturers of
Electric Motors
Electric Motor Grinders
Battery Chargers
Fast Battery Chargers
Battery Testers

Write for Bulletin

BALDOR ELECTRIC COMPANY
4375 Duncan Ave. ST. LOUIS, MO.



TO REPLACE AILING AIR, FUEL and OIL LINES with

BUNDYFLEX
Original Equipment
COPPER COATED METAL TUBING

USE OUR
FLAREMASTER
FLARING TOOL
for a perfect
double-lap flare



CONTINUOUS FUSED
DOUBLE-WALL CONSTRUCTION

1. COPPER COATING protects outer surface
2. COPPER FUSED CENTER stops corrosion
3. COPPER LINING protects inner surface

STANDARD EQUIPMENT ON G-M, CHRYSLER and FORD CARS and TRUCKS

Also used for original installation and replacement on Buses, Farm Tractors, Refrigerating and Air Conditioning Equipment, Oil Burners, Machine Tools, etc.

Always Better than Copper Tubing for Automotive Installations.

Easy to BEND, FLARE,
SOLDER, BRAZE, WELD

Used with any standard flared, compression or inverted flare fittings — over twice as strong as copper tubing, with double the resistance to vibration fatigue.

IMMEDIATE DELIVERY

Available in 25-ft. coils, sizes 1/4" to 3/4", for brake lines, oil lines, fuel lines, etc. Ask your Jobber.

BUY
BONDS
FOR
VICTORY

EVERHOT PRODUCTS CO.
2055-59 W. CARROLL AVE.
CHICAGO, ILL., U. S. A.

Recent Rulings

(Continued from page 146)

must be sold at OPA prices for this class of tire. Dealers are no longer required to keep a record of tires branded.

* * *

TIRE CORD. Beginning Oct. 1, 12 producers of cotton and rayon tire cord have been ordered to operate all their facilities to produce the maximum amount of tire cord, so that stocks will be adequate to meet the increased schedule of tire production.

* * *

TRUCK PARTS. ODT maintenance specialists in 142 district offices will help truck owners and operators to locate repair parts, the ODT announces. The specialists, having access to interchangeable parts lists, will seek the needed parts through parts makers and ODT district offices outside the district where the need arises.

* * *

VALVES. The use of chromium and nickel in intake as well as in exhaust valves is restricted by WPB Order L-128, as amended Sept. 18. No material except carbon steel may be used in intake valves except by specific WPB authorization. The optional percentages of other metals that may be used in exhaust valve are left unchanged, provided that, where these percentages are used, the steel must be produced from a melting charge of which not less than 90 per cent is aircraft valve steel scrap. Optional maximum percentages are: Chromium 15 per cent; nickel 15 per cent, tungsten 3 per cent.

* * *

GRADE A CAMELBACK. The OPA has set maximum prices for recapping truck and bus tires smaller than 8.25-20 with Grade A camelback. The ceilings are slightly higher than the maximum for Grade C. For example, the Grade C ceiling for a 7.00-20 tire, with conventional tread, is \$11.25, while the Grade A ceiling is \$11.80.

* * *

MOTOR DELIVERIES. The ODT has extended the restrictions on delivery by motor truck, imposed upon the Northeastern states last spring, to the rest of the country. Among deliveries prohibited are retail delivery of packages weighing less than 5 lb. or measuring 60 in. or less in length and girth, retail deliveries on Sunday except ice, milk, or cream, and wholesale delivery of alcoholic beverages more than once a week.

* * *

GRADE I TIRES. Eligibility rules governing the rationing of Grade I new tires have been stiffened drastically by the OPA, which, effective Sept. 25, removed all owners except C book holders with a mileage allotment of 601 miles a month from the

(Continued on page 148)



**Wheel
Alignment
and the
Man-Power
Shortage**

To meet the shortage of skilled labor for wheel alignment service work, fleet owners all over the country are turning to the Micro-Linor—the new type of alignment instrument so simple that even a green hand can quickly learn to use it.

The Micro-Linor has a dial that tells you at a glance how each wheel is rolling. Its patented "Tracer-Wheel" quickly indicates alignment defects before they develop into major repair jobs.

The Micro-Linor does things that are impossible with any other type of alignment instrument, because it checks wheel-roll the only logical way—with the vehicle actually in motion and under load.

Investigate! Write for literature and list of prominent users!

NEW! "TOE-IN"
Measuring Gauge

Only
10 Inches
Long

\$5.95

In strong
wooden
case



The
"One Man" Gauge

The Micro-Linor Toe-In Measuring Gauge requires only one man to operate it. Just attach the grippers to the rims and take front reading. Then roll vehicle forward and take rear reading.

Quicker—because gauge remains in same spot for both readings. All done in less than 2 minutes. Simple. Extremely accurate. Fits any vehicle.

Packed in strong wooden case to keep in tool kit. Every mechanic should own one.

WRITE FOR
CATALOG

MICRO-LINOR SERVICE CORPORATION
1635 W. Fort St. Detroit 16, Mich.

Keep'em Rolling



WITTEK NOC-OUT HOSE CLAMPS



The standard of the industry. Quick-tightening, perfect leak-proof hose connections, for original equipment and replacement. For Radiator, Heater, Booster Brakes and High Pressure hose connections. Wittek Manufacturing Co., 4305-15 W. 24th Place, Chicago, Ill.

WITTEK NOC-OUT HOSE CLAMPS

★ KEN-TIRE TOOLS ★



KEEP AMERICA'S KEY TRANSPORTATION ROLLING!

★ with ★
KEN TIRE TOOLS
REG. U.S. PAT. OFF.

SEE YOUR LOCAL JOBBER OR WRITE FOR ILLUSTRATED LITERATURE

THE KEN TOOL MFG. COMPANY
AKRON, OHIO

Make Big Profits on Small Investment in

SHURHIT IGNITION PARTS



Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts . . .
Contact Points . . .
Condensers . . .
Rotors . . . Caps
Coils . . .
Switches, etc.

SHURHIT PRODUCTS, INC.
Waukegan, Ill.

FOR WARTIME LUBRICATION

... YOU NEED
AND CAN STILL GET

★ **DOOR-EASE**
STAINLESS STICK LUBRICANT
DRIPLESS OIL

★ **RUGLYDE**
RUBBER LUBRICANT
from leading Jobbers

AMERICAN GREASE STICK CO.
MUSKEGON, MICHIGAN

Recent Rulings

(Continued from page 147)

eligibility list. Previously holders of both B and C books could obtain Grade I tires if they had mileage allotments of 241 miles or more a month.

* * *

USED-CAR TIRES. As forecast in the September MOTOR AGE, automobile dealers have been granted permission to use Grade III tires and new tubes to replace unserviceable tires and tubes on used cars being held for resale. Application must be made to the dealer's local War Price and Rationing Board for a tire-rationing certificate.

* * *

NEW-CAR GAS. The distance for which gasoline may be used to deliver a newly purchased new or used car has been set at a maximum of 200 miles by the OPA.

* * *

TRUCK GAS. Commercial vehicles in the 12 Northeastern states and District of Columbia will, with some exceptions, receive no more gasoline during the fourth quarter than they received in the third quarter, which allotment was 40 per cent less than normal.

* * *

BLANKET PRIORITY. Blanket preference ratings assigned for MRO purposes may be applied by persons eligible to use them for the repair of plant machinery and equipment, even if the repair job does not involve delivery of repair parts or materials, the WPB has ruled. For the purpose of this part of the order, repair means to fix a plant, machinery, or equipment after it has broken down or when it is about to break down.

The interpretation also states that blanket MRO ratings may not be used for automotive maintenance equipment.

CLASSIFIED ADVERTISEMENT

SOUTHEASTERN DISTRIBUTION
INCREASE YOUR JOBBING DISTRIBUTION AND VOLUME IN THE GROWING SOUTHEAST THRU A WELL ORGANIZED, WELL FINANCED AND AGGRESSIVE REGIONAL DISTRIBUTOR.

YOU CAN DO THIS MORE EFFECTIVELY AND ECONOMICALLY THAN BY OPERATING YOUR OWN BRANCH. WE ARE SOUTHEASTERN MANUFACTURERS, WHO HAVE BEEN SELLING TO THE AUTOMOTIVE JOBBER FOR FOURTEEN YEARS. IN ADDITION, IN RECENT YEARS, WE HAVE DISTRIBUTED OTHER LINES FOR NORTHERN MANUFACTURERS.

WE TRAVEL THREE MEN, SELL TO OVER 300 ACTIVE SOUTHEASTERN JOBBERS AND WILL PURCHASE MERCHANDISE OUTRIGHT AND CARRY THE CREDITS.

WE CAN INSURE INCREASED VOLUME FOR ANY MANUFACTURER INTERESTED IN THE BIG POST WAR OPPORTUNITY.

IF INTERESTED, WRITE FULLY BOX 10, MOTOR AGE, PHILADELPHIA 39, PA.

BLUE CROWN SPARK PLUGS



Air Cooled

Always Dependable for Severe Service

**Finned Shell
SAVES GAS**

LARGER ELECTRODES
GIVE LONGER LIFE

Ask your Jobber
MOTOR MASTER PRODUCTS CORP.
1800 Winnemac Ave., Chicago, U.S.A.
Export Distribution
Sorg-Warner International Corp., Chicago

NATIONAL ADVERTISING Helps You SELL



**WARNER
LIQUID
SOLDER**



**WARNER
RADIATOR
CLEANER**



**WARNER
Cooling System
PROTECTOR**



**WARNER
SERVICE
CLEANER**

WARNER COOLING SYSTEM PRODUCTS

Warner-Patterson Co., 919 S. Michigan Ave., Chicago, Illinois

THERE IS A GUARANTEED

Pedrick

ENGINEERED SET
of PISTON RINGS
FOR EVERY CAR, TRUCK,
BUS, AND TRACTOR

GENERATOR RE-BUILDERS!

GET HASCO'S QUOTATIONS FIRST for lowest prices on good used parts:

Armatures	Bolts
Fields	Field Poles
Housings	Washers & Spacers
Drive Housings	Commutators
End Plates	Cores
Pulleys	Drives

Complete units suitable for rebuilding
We stock only genuine used parts. All are thoroughly tested and cleaned with the most modern methods and equipment. Each part carries our money-back guarantee.

HASCO PRODUCTS, INC.
131 Park Ave. (B) Lyndhurst, New Jersey
"Largest dismantlers and salvagers of Automotive Generators and Starters"